

# QUARTERLY REVIEW of UROLOGY

Vol. 4 No. 2

June 1949



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# QUARTERLY REVIEW of UROLOGY

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June 1949



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## FOREWORD

The QUARTERLY REVIEW OF UROLOGY is designed to present in a concise and authoritative manner not only all progress in the field of Urology alone, but also important developments in other branches of Medicine which are or may become of urologic significance. For a single individual to keep abreast of this mass of material, in which Urology is often inextricably intertwined with other clinical and pre-clinical sciences, heretofore has been impossible.

The members of the Editorial Board are charged with the responsibility of selecting from every dependable source all contributions which in their judgment are of fundamental importance and unusual merit, to which they may add their own comments. This material is classified under the following headings:

- |  |  |
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| 1. Nutrition and Metabolism                | 15. Serotum                                |
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| 6. Calculosis                              | 20. Prostate and Verumontanum              |
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Each anatomic division includes Embryology, Pathology, Diagnosis, and Treatment, and some also embrace Biochemistry, Physiology, and Pharmacology.

At the end of each division there will be references to current articles not abstracted that may be useful to authors in the compilation of their bibliographies.

The Editorial Board will welcome suggestions and criticisms.

HUGH J. JEWETT, M.D.  
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Johns Hopkins Hospital, Baltimore, Md.*

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QUARTERLY REVIEW  
of  
UROLOGY

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Volume 4



Number 2

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1. Nutrition and Metabolism

The Significance of Urine Chloride Determination in the Detection and Treatment of Dehydration with Salt Depletion. *K. Keller Van Slyke, Everett Idris Evans, Rachel Lewis and Ruth Taylor, Medical College of Virginia, Richmond, Va.* Ann. Surg. 128:391-407, September 1948.

Dehydration is separated into two categories, water depletion and salt depletion, and the recommendation is made that each type of depletion be treated separately. In primary water depletion, resulting from failure to drink sufficient amounts of fluid, the extracellular fluid tends to become hypertonic but two mechanisms combat this tendency: water passes across the cell membrane into the extracellular space and the kidneys decrease their water output to the minimum obtainable by tubular reabsorption. In primary water depletion the following may be expected: minimal urine volume, normal or increased plasma and urine chloride concentrations, and no cardiovascular changes referable to decreased plasma volume. In primary salt depletion, resulting from abnormal salt loss from the body with adequate water intake, the extracellular fluid tends to become hypotonic, a situation that the kidneys attempt to combat by continuing to excrete water but almost no salt. Plasma chloride concentration does not fall until the kidneys can no longer excrete enough extracellular water to compensate for the salt loss but when this fall occurs, there may be such a great shrinkage of plasma volume that clinical shock develops. Since in both primary water depletion and salt depletion, the kidneys make every effort to maintain isotonicity of the plasma and interstitial fluids, and since the excreted urine shows much greater variations in volume and salt concentration than does plasma, urinary analyses (if the kidneys are uninjured) provide an earlier and more sensitive indication of the occurrence and type of dehydration than do plasma analyses. Urine volume and salt concentration determinations, since they may be made at the bedside, serve as routine guides to parenteral water and salt administration. According to evidence presented in the literature and obtained from experi-

ments on human volunteers, there is justification in the suggestion that "water and salt balance will be properly maintained if daily urine volume exceeds 1500 cc. and urine salt concentration approximates 3 Gm. per liter". If the bedside urine salt concentration determination indicates more than 3 Gm. of salt per liter of urine, a dextrose infusion may be given; if less than 3 Gm., a saline infusion may be administered. The presence or absence of body salt depletion may be detected by the urine salt concentration determination (using the Fantes test, salt depletion may be assumed to be present if one drop of silver nitrate turns the urine-potassium chromate mixture red). These guides must of course be supplemented by clinical observations. The abandonment of plasma chloride determinations is not suggested, because once the urine has become salt free, the magnitude of salt depletion must be estimated by plasma chloride concentration determinations, and if these are abnormally low, the plasma CO<sub>2</sub> concentration must be measured. The plasma chloride measurement is probably a safer guide in the presence of decreased kidney function. 16 references, 3 tables, 6 figures.

## **2. Preoperative and Postoperative Therapy**

*See Contents for Related Articles*

### **3. Anesthesia**

*See Contents for Related Articles*

### **4. General Surgical Technic**

*See Contents for Related Articles*

## **5. Infections, Parasites, Toxins and Drugs**

Medical Treatment of Urinary Tract Infection. *Charles A. Noble, University of California, San Francisco, Calif.* California Med. 68:443-45, June 1948.

Careful diagnosis of urinary tract infections is important for effective therapy. Adequate fluids are essential in acute pyelitis and pyelonephritis and must be given intravenously if they cannot be taken orally. Chemotherapy should not be given too early as it may increase tissue irritation, potassium citrate or sodium bicarbonate alone often being sufficient during the first few days. Sulfonamides are usually the preferred treatment but may cause serious reactions so that other drugs are better when equally effective. They are often used excessively and may cause fatal tubulous obstruction, renal damage or anuria. Fatal bone marrow depression has been reported after doses of only 1 Gm. daily for five weeks. Sulfadiazine and perhaps sulfacetamide are preferred but a combination of sulfathiazole and sulfadiazine has recently showed promise. Penicillin has little value in urinary tract infections as most of them are caused by gram-

negative bacilli. It is specific for some strains of *Streptococcus fecalis* and occasional *Proteus* infections in parenteral doses of 40,000 to 200,000 units daily. Streptomycin has proved effective against over 80 per cent gram-negative and many gram-positive organisms in urinary infections. It has also produced temporary improvement in some cases of urinary tract tuberculosis. A total daily dosage of 2 to 4 Gm. parenterally is usually necessary, given in divided doses every three to six hours. Some more sensitive organisms however respond to 1 Gm. daily doses. Renal function is not impaired by streptomycin but simultaneous oral administration of sodium bicarbonate or potassium citrate may increase its efficiency. Maximum dosage is necessary from the beginning because many organisms rapidly develop streptomycin resistance. Mandelic acid is effective against many urinary tract infections but only if the urine is made acid to at least pH 5.5, usually by administration of 5 to 8 Gm. of ammonium chloride daily. Fluid intake must be limited to 1,000 to 1,500 cc. daily when taking this drug as it only acts through its effect upon the urine. It is therefore undesirable for patients with high temperature. It is contraindicated in cases having high blood urea and is not well taken by older people. It is most effective against gram-negative organisms. Methanamine is used in doses of 0.6 Gm. three times daily in combination with sufficient sodium acid phosphate or ammonium chloride to acidify the urine to pH 5.5. It is effective against many *Bacillus coli* infections and in low grade chronic infections. Pyridium is useful in some chronic low grade infections but is not bactericidal. Arsphenamine is effective against occasional cases of abacterial pyuria where tuberculosis has been excluded.

Acute Urinary Infections in Infants and Children. *Meredith F. Campbell, New York University College of Medicine, New York, N. Y.* New York State J. Med. 48:2397-2400, Nov. 1, 1948.

The mortality of acute renal infection in infants is approximately 3 per cent, becoming less in older children. Doubtless most renal infections are hematogenous although in some instances of primary lower urinary tract infection and particularly with obstruction, the infection may be ascending. Lymphatic bacterial spread to the kidney is generally lymphohematogenous from an infected lower urinary tract or other focus. About half of urinary infections in children are of the gram-negative bacillary type represented chiefly by *Escherichia coli communis* but also by *Bacillus proteus*, *B. pyocyaneus*, *B. aerobacter* and certain rarer forms. Most other urinary tract invaders are gram-positive cocci, predominantly staphylococci and streptococci. The precise determination of the bacterial invader is of primary concern in the selection of the chemotherapeutic or antibiotic antiseptic to be administered. Obstruction is the commonest predisposing factor in the genesis of urinary infection, and in children most of these lesions are congenital and range from stenosis of the prepuce and meatus to stricture of the renal calyx. Therapeutically, the establishment of free urinary drainage is of prime importance despite the fact that modern

chemotherapeutic agents will often sterilize the urine when obstruction exists. Yet patients thus cured should not be discharged as cured without at least an excretory urographic study to demonstrate that the upper urinary tract is morphologically normal. Pathologically the usual lesion in so-called acute pyelitis is an interstitial suppurative nephritis. Healing of the acute inflammatory lesion is sometimes followed by stricturization of collecting renal tubules and this in turn interferes with free intraparenchymal urinary drainage. In the study of urinary infection only aseptically collected specimens merit investigation and this should include culture. The specimen collection should be by catheterization in females of all ages, and by this method in the male when the specimen cannot be aseptically collected during the voiding process. In the treatment of acute infection, the establishment of free bowel evacuation and an increased fluid intake are imperative. The urinary antiseptic is administered according to bacteriologic indication. If the temperature and illness remain hyperacute for three or four days despite intensive chemotherapy, a complete urologic examination is indicated at once and this will most often disclose infected hydronephrosis above congenital ureteropelvic obstruction. Yet, renal carbuncle, diffuse renal abscess or perinephric abscess may be found. In short, these cases are predominantly urosurgical. When two weeks of modern chemotherapy fails to sterilize the urine, complete urologic examination is always indicated and by this method the correct anatomic diagnosis is made and urologic treatment is carried out according to the demonstrated pathologic changes. Yet, in most instances, the acute disease will be cured in five to seven days by modern chemotherapy. No child should be discharged as cured until at least two negative cultures of aseptically collected specimens of urine have been obtained. 1 table.—*Author's abstract.*

A Present Day Rationale for the Treatment of Urinary Tuberculosis.  
Chairman's Address. *Reed M. Nesbit and A. Waite Bohne, Ann Arbor, Mich. J.A.M.A. 138:937-41, Nov. 27, 1948.*

A reorientation of our habits of thinking in the matter of treating urinary tuberculosis is necessitated by the advent of streptomycin. Clinicians are now treating several types of urinary tuberculosis with prolonged sanatorium care and full courses of streptomycin therapy: six months should be regarded as the minimum of sanatorium care while longer periods of time are often necessary, and ninety to one hundred and twenty days of antibiotic therapy are recommended. Many have found from 1.5 to 2.0 Gm. per day to be the most effective dosage of streptomycin. The types of conditions that are now treated in this manner include bilateral renal tuberculosis, residual cystitis following nephrectomy and clinically unilateral kidney lesions when there are no pyelographic evidences of the disease. At the present time most urologists are treating, by nephrectomy, the clinically unilateral lesions of the kidney that can be demonstrated by roentgenogram and many are advocating short preoperative and postoperative courses of streptomycin to prevent the traumatic spread of the disease. The rationale of streptomycin therapy is based on

the knowledge that urinary tuberculosis, as showed by Medlar, is universally bilateral. According to the analysis of 1,380 cases presented previously in our paper, nephrectomy alone cures only about half the patients. In view of these two facts, it would seem logical to provide any therapeutic measure which might enhance the complete healing of tuberculosis. The nephrectomized patient should be afforded the same advantages of modern therapy that are considered appropriate for other patients suffering from bilateral renal tuberculosis. Surgical removal of the grossly diseased kidney is a well accepted principle but perhaps in the future nephrectomy can be relegated to a position below that of streptomycin and rest in the order of importance. Since it has been showed that even ulcerative renal lesions will sometimes heal during treatment with streptomycin, it would be reasonable to withhold surgical treatment, at least temporarily, in all cases of clinically unilateral renal tuberculosis. The patient should be placed on a regimen of strict rest in a sanatorium and should receive 2.0 Gm. daily of streptomycin for sixty days. At the end of this time a survey should be made to determine, by urinalyses and retrograde pyelography, the results of treatment. When the studies indicate conspicuous evidences of healing the plan of treatment should be continued for an additional sixty days, with repeated observations of the state of the lesion thereafter. The patient should then complete a minimum period of six months of sanatorium care or longer if necessary, in accordance with the needs for treatment. If at the termination of the initial sixty day period, the patient's symptoms remain unaltered and pus and tubercle bacilli are still present in the urine obtained by ureteral catheter, nephrectomy would be indicated. Postoperatively streptomycin therapy should be continued for sixty days longer and the patient kept at rest for the prescribed six month period, or longer if need be. Although this plan certainly will not prove efficacious in eliminating the necessity for nephrectomy in all instances, it promises, when nephrectomy is carried out, to diminish the likelihood of miliary dissemination during operation and to militate against wound disruption following nephrectomy, and it will also serve to influence favorably the subsidence of other metastatic lesions which might still be active in the patient, particularly those in the remaining kidney, thus enhancing his chances for recovery. Our reorientation in thinking regarding the treatment of urinary tuberculosis must be predicated on a realization that operation has failed dismally in the treatment of this disease, for in the past the nephrectomized patient has had only an even chance for survival. 8 references. 4 figures.—*Author's abstract.*

Various Phases of the Use of Streptomycin in Tuberculosis. *H. J. Corper and Maurice L. Cohn, National Jewish Hospital, Denver, Colo.* J.A.M.A. 137:357-62. May 22, 1948.

The purpose of these investigations was to afford scientific information for determining whether streptomycin and related antibiotics might be beneficial in human tuberculosis and, as far as possible, to explain their mode of action in man. Streptomycin, properly administered retards the

growth or development of human tubercle bacilli in vitro and in vivo. A series of controlled experiments were performed to study the in vitro effects of streptomycin. In general, less streptomycin was required to retard growth of test organisms in poor nutrient medium than in good nutrient medium. Demonstration of streptomycin by unit assay in the fresh organs of exsanguinated guinea pigs was attempted. Guinea pigs weighing about 700 Gm. were given 125,000 units of Streptomycin parenterally. One hour later, undiluted and diluted organs were implanted with acid-fast saprophyte "Day". Growth occurred in all samples, suggesting absence of demonstrable retarding concentrations of streptomycin in the organs. To study the action of streptomycin on virulent tubercle bacilli in vivo, guinea pigs were infected and treated at various periods for prolonged intervals. Prolonged treatment retarded tuberculosis but did not prevent death. Virulent bacilli were cultured from the important organs in every case. Some of the guinea pigs treated for forty days survived nearly as long as those treated continuously. This suggests that streptomycin exerts its initial and potent effect at the time of infection and that establishment of immunity is an important factor in preventing spread of tuberculosis and delaying death. Streptomycin did not appreciably affect the viability of avirulent human tubercle bacilli in guinea pigs. No effect on the intracutaneous tuberculin reaction was noted with streptomycin. Streptomycin apparently leaves the blood rather rapidly after injection and cannot be demonstrated in the organs or in tuberculous tissue. The occurrence of a delayed action was suspected. Guinea pigs were treated with 25,000 units of streptomycin daily for eighty-two to ninety-one days. One day after treatment was discontinued, they were infected with virulent human tubercle bacilli. This group showed an increased average duration of life as compared with untreated controls. In another series, daily injections of 25,000 units of streptomycin caused retardation of tuberculosis in the animals comparable to that obtained with the same total amount daily in divided doses. A chemical agent, not an antibiotic, which retards tubercle bacilli in vitro but not in vivo, is mentioned and is to be reported later. 11 references. 6 tables.

Determination of Streptomycin Sensitivity of Tubercle Bacilli by Use of Egg-Yolk Agar Medium. *Alfred G. Karlson and Gerald M. Needham, Ph.D., Mayo Foundation, Rochester, Minn.* Proc. Staff Meet., Mayo Clin. 23:401-408, Sept. 1, 1948.

Egg-yolk agar containing streptomycin is prepared by adding the required amount of streptomycin and the yolk of one fresh egg to 120 ml. of sterile melted and cooled nutrient agar. Difco bactonutrient agar is satisfactory. The streptomycin, egg yolk and agar mixed by gentle rotation of the flask to preclude the formation of foam. The mixture is then dispensed into sterile test tubes and allowed to harden in a slanting position. The medium requires no further sterilization and is ready for use as soon as the slants are firm. Tubes of medium with concentrations of 1, 10, and 100 micrograms of streptomycin per milliliter of medium are used for

routine work, plus a control tube containing no streptomycin. Since one egg yolk has a volume of about 15 ml., the amount of streptomycin to be added to the 120 ml. of melted and cooled agar is calculated on a volume of 135 ml. The streptomycin is added before the egg yolk so that both may be mixed in one operation. Tests for the sensitivity of tubercle bacilli to streptomycin may be done by inoculating the medium directly with sputum or other material which has been treated to destroy contaminants. It is necessary that the tubercle bacilli be distributed uniformly in the specimen and that each tube of medium be inoculated with the same amount of inoculum. For specimens with few bacilli it is recommended that a preliminary isolation be made and that tests be done on pure cultures. This will be found necessary in the case of patients being treated with streptomycin and in which the number of bacilli in the specimens is decreased. If the culture to be tested consists of moist growth that breaks up easily, the tubes may be inoculated with a loop. Large clumps of bacteria are undesirable since they may be later mistaken for colonies. A uniform inoculum may be made by grinding several colonies with sterile broth or water in a sterile mortar to make a concentration such that minute clumps are barely visible. Each tube of medium is inoculated with 0.1 ml. of the suspension. Inoculum may also be prepared by growing the culture in liquid Dubos medium for forty-eight to ninety-six hours and using the resultant uniform growth. The results are recorded after fourteen days of incubation at 37 C. or as early as growth becomes visible. The resistance to streptomycin of the culture being studied is recorded as the maximal concentration of streptomycin per milliliter of medium which permits growth. If desired, the sensitivity of the cultures may be recorded as the minimal concentration of streptomycin which prevents growth. Cultures from patients who have received no streptomycin therapy will grow only in the control tube or in the tube containing 1 microgram of streptomycin per milliliter of medium. Cultures from 149 untreated patients were found to be resistant only to 1 or less than 1 microgram of streptomycin per milliliter of egg-yolk agar. Tests have showed that streptomycin in the amounts used remains stable in egg-yolk agar during storage and incubation. 7 references. 1 table. 2 figures.—*Author's abstract.*

Chemotherapy of Lymphogranuloma Venereum. *Geoffrey Rake, Squibb Institute for Medical Research, New Brunswick, N. J.* Am. J. Trop. Med. 28:555-62, July 1948.

The sulfonamides have been the only chemotherapeutic agents clinically valuable against lymphogranuloma venereum and their effect in this disease has not been as efficacious as in other bacterial infections because, while the acute symptoms were relieved, the tissues were not sterilized even with high blood sulfonamide levels, serologic and intradermal tests remaining positive. Repeated investigations have indicated the highest to lowest order of sulfonamide activity in terms of actual doses administered to be sulfamerazine, sulfadiazine, sulfathiazole, sulfaguanidine, sulfanilamide and sulfapyridine. Experiments in mice showed that the carrier

state in this disease was practically 100 per cent present three weeks after completion of sulfonamide therapy but then gradually disappeared, though about 30 per cent still carried the virus eighty-three weeks later. The carrier rate fell below that of untreated control animals however with sulfonamide blood levels of 8.5 per 100 ml. Most virus strains recovered from sulfonamide treated mice showed increased sulfonamide resistance capable of producing an unusually sulfonamide resistant type of the disease in a new individual. Penicillin was found to be active against all members of the Chlamydozoaceae family but to have disappointingly low activity against lymphogranuloma venereum. It does affect the virus both *in vitro* and *in vivo* but animal experiments showed it to be doubtful that penicillin therapy alone would be efficacious in lymphogranuloma venereum. The authors found both streptomycin and streptothrycin to be inactive against the infecting agent of lymphogranuloma venereum but consider it possible that chloromycetin may prove active. 18 references. 1 table. 3 figures.

Rectal Stricture of Lymphogranuloma Venereum. *Lester Breidenbach and Louis R. Slattery, New York, N. Y.* Ann. Surg. 128:1079-91, December 1948.

A review is given of the various methods for handling the stricture of lymphogranuloma venereum. Most methods carry a mortality and the end results are not reported as good. All authors agreed that radical extirpation of the diseased area was necessary for cure. Since we are not dealing with carcinoma and the disease occurs in a younger age group, re-establishment of intestinal continuity and restoration of sphincter control were essential. This report is based on 18 cases followed to completion with complete cure of the disease and restoration of normal sphincter control; 1 case involved up to the sigmoid; another case had a skip area and then extended to the splenic flexure. The technic is as follows: a completely defunctioning colostomy is done in the right half of the transverse colon and this is allowed to exist for three to six months. The second stage is then done and a perineal resection beginning 3 to 5 cm. above the anus to the rectosigmoid is completed, anastomosing the proximal divided bowel to the anus just above the sphincter. After complete healing the colostomy is closed by end to end suture. In the cases extending above the rectosigmoid an abdominal approach is made, the involved colon resected as high as necessary. The cut end is mobilized and brought down to the pelvis, then the perineal portion completes the continuity of the bowel. A complete resection results in a cure and all 18 cases were cured. One case where resection was not complete, stricturing recurred and a secondary resection had to be done which resulted in cure. By a defunction colostomy the inflammatory area was put at physiologic rest and then allowed resection as high in the colon as necessary but it allowed anastomosis to the anus, saving the sphincter. All cases were cured and retained normal sphincter control. 17 references. 1 table. 3 figures.—*Author's abstract.*

**Granuloma Inguinale. Treatment with Streptomycin.** *Lydia C. Marshak and Jack Rodriguez, Chicago Intensive Treatment Center, Chicago Health Department, Chicago, Ill.* J.A.M.A. 137:1293-97, Aug. 7, 1948.

The Donovan bodies causing granuloma inguinale have now been showed to be gram-negative bipolar bacilli. This discovery indicated that one of the antibiotics might prove valuable in treatment of the disease and streptomycin was found efficacious. Results obtained in the treatment of 11 cases of granuloma inguinale with streptomycin are reported; 3 patients received a total dosage of 4 to 6.4 Gm. over eighteen to forty-one days; 8 received 3.4 to 12.16 Gm. over fifteen to thirty days. Immediate favorable response to treatment appeared in all patients, the Donovan bodies disappearing and the lesions healing. Progressive resolution of the lesions continued long after the streptomycin treatment was stopped. All 3 patients in the first group had relapses in from three weeks to eight months. The remaining 8 showed no evidence of relapse in from two to fifteen months and were apparently cured. Four of these 8 had had lesions from two to twenty-eight years and had not been improved by antimonial treatment but promptly responded to streptomycin. No complications such as cutaneous eruptions, vertigo or deafness occurred in any of these patients, possibly because of the low dosage. The best total dosage and time-dose requirements were not determined in this small series. 28 references. 1 table. 2 figures.

**Treatment of Acute Uncomplicated Gonococcal Urethritis with a Single Dose Water-Soluble Penicillin Preparation.** *Leo Loewe, Theodore Rosenthal, William Leifer, Perry Katzen, Harold B. Eiber and Sidney Cohen, Jewish Hospital, Brooklyn, N. Y.* J. Urol. 60:958-63 December 1948.

A new single dose, dehydrated penicillin/gelatin-dextrose mixture is effective for the routine treatment of acute, uncomplicated gonococcal urethritis. It is water-soluble, nontoxic, nonirritant, nonallergenic and easy to administer by intramuscular or subcutaneous injection. Of the 128 patients suitable for statistical study, 123 (96.1 per cent) were satisfactorily cured and 2 (1.5 per cent) were probable reinfections. Twenty-six of the infecting organisms in this series were processed for penicillin sensitivity. The values were unexpectedly high, ranging from 0.004 to 0.25 Oxford units per cubic centimeter of test broth for bacteriostasis, and 0.008 to 0.5 Oxford units per cubic centimeter of test broth for the minimal lethal dose. No correlation was found between penicillin sensitivity and treatment failure. The percentage of successes in this series may be attributed to the concentration and duration of penicillin levels in the blood. The peak levels which persisted for eight to twelve hours were sufficient for minimal lethal dosage purposes for even the most resistant strains of organisms encountered in this series. These results compare favorably with any previous studies conducted in a comparable manner. 3 tables.—*Author's abstract.*

Streptomycin in Gonorrhea with Its Effects upon Dark-Field Positive Lesions of Syphilis. *R. R. Wilcox, King Edward VII Hospital, Windsor, England.* Brit. M. J. 4588:1015-18, Dec. 11, 1948.

Penicillin controls gonorrhea well but it may also modify or mask an incubating syphilis. Streptomycin has been proved quite effective against gonorrhea, chancroid and granuloma inguinale but slightly, if at all, effective against syphilis. Streptomycin would be especially valuable in venereology if a single dose cured gonorrhea without affecting dark-field positive syphilitic lesions. This would be especially true in undiagnosed genital lesions, suspected false positive blood tests or the retreatment of patients with a Herxheimer-like reaction to penicillin treatment. Streptomycin resistance seems permanent if once acquired but this is unimportant if gonorrhea is cured by 1 injection. Results obtained in the treatment of 7 cases of gonorrhea with streptomycin are presented. One case was complicated by cowperitis but the others were uncomplicated. These patients received a single intramuscular dose of 0.2 to 0.6 Gm. of streptomycin in 2 to 4 ml. of normal saline solution. The initial response in 5 cases was as good as with penicillin in water or oil-wax media. One case apparently relapsed three days after receiving a 0.6 Gm. dose but was cured by another single dose of the same amount. The case of cowperitis received 0.2 Gm. but relapsed two days later with abscess formation in the gland and was then successfully treated with penicillin. A single patient with dark-field positive primary syphilis received 0.6 Gm. of streptomycin intramuscularly. The *Treponema pallidum* was still easily found in the dark-field twenty-four hours later. Mild cerebral symptoms in 1 case and slight pain at the injection site in another were the only toxic effects recorded. These cases indicate that streptomycin is especially valuable in the treatment of cases of gonorrhea strongly suspected of also having a syphilitic infection because it apparently does not mask an incubating syphilitic infection. A three month observation period after treatment will therefore probably be sufficient to exclude syphilis instead of the usual six months after penicillin. 36 references. 1 table.

Toxic Reactions During Streptomycin Sulfadiazine Therapy of Brucellosis. *Norman B. McCullough and C. Wesley Eisele, School of Medicine, University of Chicago, Chicago, Ill.* J. A. M. A. 139:80-82, Jan. 8, 1949.

The toxic effect of streptomycin on the eighth cranial nerve has been well known since early in its clinical use. Published opinions indicate that the toxicity of streptomycin to the central nervous system is confined almost entirely to this nerve, predominately to its vestibular branch. During the course of treatment of brucellosis with the combined use of streptomycin and sulfadiazine, toxic reactions of the nervous system have been encountered which seemed to be out of proportion to the small doses of streptomycin and to involve more widespread areas of the brain than has generally been recognized. In particular, 2 cases of severe encephalopathy are described. These reactions occurred within a few hours after the initial dose of streptomycin. The predominating symptoms and signs

included dizziness, severe headaches, semi-stupor, mild disorientation, ptosis of eyelids, diplopia, blurring of vision, paresthesias, hypalgesias and elevation of temperature. Spinal fluid examinations were essentially negative. In addition to these severe reactions minor reactions observed in other patients are discussed. These consisted primarily of vestibular derangement, paresthesias and hypalgesias. These observations emphasize the toxicity inherent in streptomycin therapy, particularly when combined with sulfadiazine. They serve to raise seriously the question of the significance of minor neurologic signs, the paresthesias, which have been widely recognized to commonly accompany streptomycin therapy. The possible significance of these minor clinical signs of toxicity have previously been largely disregarded. It should be remembered that the lack of definite neurologic signs does not exclude the possibility of insidious or latent damage to many areas of the brain. 11 references.—*Author's abstract.*

Filarial Funiculitis. Report of a Case Discovered at Operation for Inguinal Hernia. *Bradley L. Coley and Benjamin Lewis, New York, N. Y.* Am. J. Surg. 76:15-22, July 1948.

Filariasis may be manifested by an obstructive lymphangiectasis of one or both spermatic cords, and give rise to a funiculitis characterized by dilated and hypertrophied lymph vessels containing a milky fluid. This condition may occur without elephantiasis of the lower extremities or scrotum. The authors presented a case in a 25 year old Puerto Rican, who was admitted on June 17, 1946 with a chief complaint of progressive painless swelling of both groins following a strain from lifting one month previously. While the patient was aware of elephantiasis in Puerto Rico he denied its existence in himself, his family and his native town. He had been working in the United States for the past eighteen months. Physical examination on admission was negative except for a bilateral inguinal hernia which was operated upon on June 18, 1946. Operation revealed a left hernial sac measuring 8 cm. in length and a right one measuring 3 cm. Upon opening the hernial sacs an abnormal amount of thin yellowish peritoneal fluid welled out. Within the internal spermatic fascia, there was a mass of coiled tubular structures containing a milky fluid. They were prominent proximally at which point they disappeared into the internal inguinal ring; distally they tapered off to terminate at the tunica vaginalis testis. Those on the left were more pronounced. These peculiar structures, which later were showed to be dilated lymph vessels, were loosely attached to the other cord structures. They collapsed and expanded on digital compression and were thick and rubbery on palpation. The tubular masses were dissected from the cord, clamped and ligated at the internal inguinal ring and at the tunica vaginalis testis and were excised. The patient made an uneventful recovery and was discharged on June 28, 1946.

A roentgenogram of the pelvis and chest was reported as negative for calcified worms. Culture of the fluid in the lymph channels removed from the left spermatic cord was sterile. The nature of the underlying pathologic disorder being unsuspected at operation, examination of the

lymphatic varices for adult worms was not made. Microfilariae of *Wuchereria bancrofti* were identified at the first blood study. The smear showed 31 per cent eosinophilia at the same time. A skin test with antigen of *Dirofilaria immitis* was not performed. The pathologic report was bilateral obstructive lymphangiectasis of the inguinal lymphatic plexuses. 30 references. 3 figures.—*Author's abstract.*

Bilharzial Disease of the Bladder as Determined at Autopsy, with Particular Reference to Its Diagnosis by Mucosal Snips. *Michael Gelfand, Salisbury, Southern Rhodesia.* Am. J. Trop. Med. 28:563-66, July 1948.

The lesions found at autopsy in established bilharzial disease are classified as tubercles, "sandy" patches and papillomata. The tubercles are whitish, 0.5 to 2 mm. in size. "Sandy" patches are coalesced tubercles which vary greatly in shape and size. Papillomata are sessile or pedunculated, reddish, warty growths and occur in about 8 per cent of cases. All are chiefly found on the fundus. Heretofore, these changes in the bladder mucosa have been considered diagnostic of the presence or absence of the disease. In this study, a series of 50 consecutive bilharzial bladders were removed postmortem, the organ digested in 10 per cent caustic potash at 60 C. for ten hours, the digested material centrifuged and examined for ova with a low power lens. Ova were found in 32 per cent of bladders which had appeared normal to the naked eye and macroscopic lesions were found in the remaining 68 per cent. It was proved that *Schistosoma mansoni* are chiefly concentrated in the rectum and could be demonstrated by examining a small snip of rectal mucosa from living persons passing the ova in their stools. Snippings of the bladder mucosa from 10 of these autopsied bladders were therefore similarly studied and nine snips found positive for ova of *Schistosoma haematobium*. These results are valuable clinically because the presence of vesical bilharziasis may be demonstrated in bladders which appear normal cystoscopically by finding *Schistosoma* ova in biopsy snips. 9 references. 2 tables.

Absorption, Distribution, and Renal Excretion of Mandelamine (Methenamine Mandelate). *John V. Scudi and John F. Reinhard, Yonkers, N. Y. J. Lab. & Clin. Med. 33:1304-10, October 1948.*

Mandelamine readily penetrates the red blood cell and distributes itself in proportion to the water content of whole blood. In the dog the volume of distribution approximates the total volume of body water. The volume of distribution increases with time, presumably because of extra-renal activity. The drug undergoes tubular reabsorption in the dog. These observations are consonant with the view that the drug persists in the organism. In human subjects, 1 Gm. of Mandelamine administered three or four times daily is adequate to produce and maintain antibacterial concentrations of the drug in the urine. The notable lack of toxicity of Mandelamine is confirmed. 8 references. 7 tables.—*Author's abstract.*

The Clinical Use of a Triple Sulfonamide Mixture. *John H. Ledbetter, Nashville General Hospital, Nashville, Tenn. and George E. Cronheim, Research Department of the S. E. Massengill Co., Bristol, Tenn.* Am. J. M. Sc. 216:27-31, July 1948.

The chief danger of sulfonamide therapy has been kidney damage from precipitation of the free or conjugated drug. This is avoided by multiple sulfonamide therapy. The three most commonly used drugs are sulfathiazole, sulfadiazine and sulfamerazine. These have similar antibacterial activity and are therefore interchangeable in most cases needing sulfonamide therapy. It is reported that this combination has been successfully used in many hundreds of cases of acute pneumonia in Sweden without any known cases of renal calculi. The chief interest in multiple sulfonamide therapy has been the reduction of renal complications, especially crystalluria. This complication was reduced from 26 to 28 per cent of cases when a single sulfonamide was used to less than 3 per cent by using a mixture of these 3 sulfonamides without any alkalizing agent. A triple combination of sulfadiazine 3.5 per cent, sulfamerazine 3 per cent and sulfathiazole 3.5 per cent by weight volume in an aromatized aqueous suspension base was administered to 28 unselected surgical patients requiring sulfonamide treatment. From 20 to 40 cc. were given initially, representing 2 to 4 Gm. of total sulfonamides followed by 10 cc. or 1 Gm. of total sulfonamides every four hours. The average blood concentration was 7.8 mg. free and 8.5 mg. of total sulfonamides. These figures represent expected values from known average blood levels of each of these sulfonamides and indicate that absorption of each is not interfered with by the other components. Multiple sulfonamide mixtures are also better tolerated so that the total dose of sulfonamides may be increased than higher blood levels are obtained. This is especially important in conditions like meningitis where the drug has to pass into the cerebrospinal fluid and in cases infected by sulfonamide resistant pathogenic organisms. Another advantage of multiple sulfonamide therapy is the low acetylation rate in both blood and urine. This apparently indicates that each sulfonamide is processed separately in accordance with its low individual concentration. This should make multiple sulfonamides more effective because only free sulfonamides have a bacteriostatic action. The rapidity of therapeutic response to the multiple sulfonamide mixture is emphasized. It was unnecessary to stop the treatment in any of these cases. 16 references. 2 tables. 2 figures.

Caronamide and Penicillin. Serum Levels in Human Beings, Following Multiple Doses of the Drugs. *Manson Meads, Roland V. Long, Sherman H. Pace and George T. Harrell, Winston-Salem, N. C.* J.A.M.A. 138:874-77, Nov. 20, 1948.

Seventeen ambulatory patients under 60 years of age without cardiac, liver or kidney damage received 100,000 units of crystalline penicillin G intramuscularly every four hours for seven days. On the second, third and fourth days, caronamide simultaneously was administered orally to

7 patients (group A) in doses of 2 Gr. every four hours, to 10 patients (group B and C) in doses of 4 Gr. every four hours. One to three levels were determined daily. The samples of serum in groups A and B were drawn four hours after the preceding dose and in group C two hours after the preceding dose. The range of individual variation in caronamide and penicillin levels was great. When plotted, the mean value shows little effect of caronamide on penicillin levels in group A. In groups B and C, the caronamide concentration increased steadily to the fourth day; mild toxic reactions were observed with caronamide levels exceeding 45 mg. per cent. The penicillin level reached a peak on the third day and remained there through the fourth day. The accumulation of caronamide in concentrations exceeding 20 to 25 mg. per cent in the serum is accompanied by a significant rise in serum penicillin levels. Short interval or single dose studies have not disclosed this cumulative effect which could lead to toxic reactions. If long-course pharmacologic evaluation in human beings shows the drug to be safe, caronamide would be useful in the treatment of infections with organisms relatively resistant to penicillin. Higher penicillin levels than can be attained economically with penicillin alone would favor rapid eradication of the organism and prevent a further increase in resistance from exposure to subeffective concentrations. 8 references. 3 figures.

—Author's abstract.

The Evaluation of Sulfathalidine and Streptomycin as Adjuncts in Preparing the Large Bowel for Surgery. *Robert J. Rowe, Earle H. Spaulding, Dorothy S. Madajewski and Harry E. Bacon, Temple University School of Medicine, Philadelphia, Pa.* Surg., Gynec. & Obst. 86: 576-82, November 1948.

The subjects selected for this study were patients with carcinoma of the rectum or colon. The intestinal bacterial flora was studied through coliform and total bacterial counts. When sulfathalidine, 0.1 Gm. per kilogram of body weight daily, was administered, the average fecal coliform count decreased by 99.99 per cent in three and one-half days; when streptomycin 2 Gm. was given, the same decrease occurred in two days; and when combined therapy was used, the same decrease occurred in twenty-four hours. Reversion in count because of resistant organisms was noted when streptomycin alone was used. Although this phenomenon was not observed when the sulfonamide was used alone, it was not entirely prevented by the combined use of the drugs. Generalized peritonitis which occurred postoperatively and proved fatal was brought about by a coliform organism which became resistant to both drugs before operation. Although the use of streptomycin alone is not recommended, it may be added forty-eight hours before surgery when the preoperative program includes sulfathalidine for five to seven days preoperatively. By adding the streptomycin late, the higher antibacterial activity is obtained and chance of producing resistant organisms is minimized. Evaluation of the efficacy of these drugs can be more conclusive after the

results of more detailed investigation are obtained. 14 references. 6 charts.

**Streptomycin in Surgical Infections. Part V. Infections of Soft Tissues.** *Edwin J. Pulaski (Major, M.C., A.U.S.), Frank W. Spicer, Jr., (Capt., M.C., A.U.S.) and Melvin J. Johnson (Capt., M.C., A.U.S.), Brooke General Hospital, Fort Sam Houston, Tex. Ann. Surg. 128:46-56, July 1948.*

Results are presented of the treatment of 67 cases of cellulitis, 30 cases of localized infection and 5 of specialized infection with streptomycin. No fresh wounds were treated. Streptomycin alone was used in the treatment of 68 of the 102 cases and other bacteriostatic agents were used in addition in 34 cases. Results were classified as good, doubtful or poor on the basis of clinical response. The predominating organisms in 61 cases were gram-positive cocci. These patients were given 1 to 3 Gm. of streptomycin parenterally daily. Good results were obtained in 47, doubtful in 7 and poor in 14 cases. The 34 cases treated by a combination of streptomycin and penicillin received from 1.5 to 3.0 Gm. streptomycin and a minimum of 240,000 units of penicillin daily. Streptomycin 0.5 per cent in a water-in-oil emulsion base was successfully used in the local treatment of 1 case. Good results were obtained in 14, doubtful in 4, and poor in 16 cases. Results in this series showed that, in order to obtain good results from streptomycin therapy in such cases, the infecting organism must be streptomycin sensitive, adequate doses must be given, there must be little or no necrotic tissue in the wound and there must be an adequate blood supply. The cases in which poor results were obtained all violated these principles as well as the rule of not giving chemotherapy or antibiotic therapy without associated adequate surgical treatment. The chief usefulness of streptomycin in acute surgical infections is in cases complicated by cellulitis. It is also useful in cases of cellulitis caused by penicillin-resistant gram-positive cocci. Topical use of streptomycin seemed useful in some cases but the general impression was that these cases would have done as well without it. Undesirable reactions occurred in 8 of 61 cases treated by streptomycin alone, though no reaction occurred in cases receiving less than 2 Gm. daily. Results in this series indicated that streptomycin therapy is not necessarily the best treatment for a given case even if the conditions for its proper use are fulfilled as it is expensive and may be toxic. It is believed that penicillin is equally effective in most cases and that streptomycin should not be used in this type of cases unless no other drug will do as well. Available statistics indicate that streptomycin is only mandatory in 1 of 85 cases. Streptomycin must be given in adequate doses when used, optimal dose being 2 to 3 Gm. daily and duration of treatment depending upon response. Recurrence is likely if treatment is stopped too soon. The optimum dosage of streptomycin with penicillin seems to be not over 1 to 1.5 Gm. daily in 0.25 Gm. doses intramuscularly every four hours with 50,000 units of penicillin. 8 references. 2 tables.

Aureomycin, A New Antibiotic. Results of Laboratory Studies and of Clinical Use in 100 Cases of Bacterial Infections. *Maxwell Finland, Harvey Shields Collins and Tom Fite Paine, Jr., Thorndike Memorial Laboratory, Boston City Hospital and Harvard Medical School, Boston, Mass.* J.A.M.A. 138:946-49, Nov. 27, 1948.

Preliminary laboratory work has indicated that a new antibiotic, aureomycin, is of low toxicity, is effective *in vitro* against a large variety of gram-positive and gram-negative bacteria and is particularly effective in experimental infections with rickettsias and with viruses of the psittacosis-lymphogranuloma venereum group. Bacteriologic tests for sensitivity to aureomycin were carried out by tube dilution or streak plate methods. Pathogenic strains of hemolytic streptococci, pneumococci, gonococci and meningococci were almost completely inhibited by aureomycin in concentration of 1 microgram per cubic centimeter or less. Staphylococci and most strains of gram-negative bacilli, including typhoid and other *Salmonella*, were inhibited by 25 micrograms per cubic centimeter or less. Only strains of *Proteus vulgaris* and of *Pseudomonas aeruginosa* required from 100 to 250 micrograms per cubic centimeter for complete inhibition. There was no evidence of cross resistance with penicillin, streptomycin, polymyxin or bacitracin. On a weight basis aureomycin was less effective than penicillin against most of the coccic organisms but about as effective as streptomycin against most of the gram-negative bacilli. The potency of aureomycin hydrochloride in a dry powder in sealed ampules and in capsules appeared unaltered for at least seven months at room temperature. It also retained its activity for long periods in solutions kept frozen at 20 C. Concentrated solution (2 mg. per cubic centimeter) in distilled water at pH 4 retained their activity for over two weeks at 4 C. and at 37 C. Aureomycin was effective only against vigorously multiplying organisms but not against fully grown or resting cultures. It was much more effective in an acid than in an alkaline medium—the reverse of streptomycin. No significant tendency for the development of resistance to aureomycin in organisms was demonstrated either *in vitro* or *in vivo*. Resistant variants could not readily be obtained by exposure of large number of bacteria to high concentrations of aureomycin. All organisms of the same species isolated from the same patient before, during and after treatment with aureomycin for varying periods up to one month or longer were equally sensitive to this antibiotic. Aureomycin appeared rapidly in the urine and was excreted continuously for two or three days after a single dose of 0.5 to 0.75 Gm. Excretion studies suggest that the optimal interval between oral doses should be about six to eight hours.

Clinical results are described in 100 cases with various bacterial infections. The usual dose in these patients (not precisely given) appears to have been 0.5 Gm. two to four times in twenty-four hours. With 66 patients with gonorrheal vaginitis the results were inferior to those with adequate doses of penicillin. In some patients with typhoid and *Salmonella* infections the results appeared favorable but were equivocal

in most. In stubborn infections of the urinary tract the results were favorable and probably comparable, if not superior, to those obtained with streptomycin or sulfonamide drugs in similar cases. Infections with *Proteus vulgaris* and *Pseudomonas aeruginosa* were not much affected. The only evidence of toxicity was the occurrence of loose bowel movements when large doses were given by mouth. Five patients with pneumococci pneumonia and 1 with meningococcemia responded well. 4 references. 1 table.

The Influence of Mineral Oil on the Absorption of Diethylstilbestrol from the Gastro-Intestinal Tract. *Ju Cheng Hsiung, Gardner M. Riley and Reed M. Nesbit, University of Michigan Hospital, Ann Arbor, Mich.* J. Urol. 60:297-305, August 1948.

An investigation of the effect of liquid petrolatum upon the absorption of diethylstilbestrol from the gastrointestinal tract was undertaken because of the clinical effectiveness of this drug in cases of prostatic carcinoma and the frequency of mineral oil catharsis in these same cases. The first procedure was concerned with determining the comparative effectiveness of orally administered stilbestrol alone and in combination with mineral oil; the second with determining the rate of estrogen excretion by those patients receiving stilbestrol therapy with and without cathartic doses of mineral oil (30 cc. at bedtime). The criterion for estrogenic effectiveness was the vaginal response noted in spayed rats. Although a unit response was produced by 1 gamma of stilbestrol in alcoholic solution, an equivalent response when mineral oil was also given, required a threefold increase in the dosage of stilbestrol. The presence of mineral oil caused an appreciable decrease in the effectiveness of stilbestrol in doses of from 1 to 4 gammas. In human subjects the effective absorption of stilbestrol from the gastrointestinal tract was not reduced by the ingestion of mineral oil when therapeutic doses of these substances were administered. The rate of estrogen excretion in patients receiving 1 or 3 mg. of stilbestrol daily was apparently not affected by the administration of 30 cc. of mineral oil at bedtime. Although the simultaneous administration of these substances may cause a reduction in the effectiveness of stilbestrol, no marked reduction should occur with the conservative use of mineral oil, particularly if the estrogen is given a few hours ahead of the mineral oil. 17 references. 8 tables. 2 figures.

## 6. Calculosis

Treatment of Bilateral Renal Calculi. *M. S. S. Earlam, Sydney, Australia. Australian & New Zealand J. Surg. 18:16-25, July 1948.*

In cases of bilateral renal calculi in which the primary lesion is an obstruction, removal of the obstruction by plastic surgery or other method, is the essential factor in treatment. In cases in which the stone formation is the primary lesion the size, number and location of bi-

lateral calculi may render the removal of such calculi a major surgical problem. The removal of a staghorn calculus is always difficult; but if a patient with bilateral staghorn calculi is seen early, before the onset of infection or any appreciable degree of renal insufficiency, operation should be seriously considered, especially if the patient is reasonably young. Roentgenologic studies show the size and complexity of the calculi and also indicate the condition of the renal parenchyma. In some cases in which one kidney shows relatively good function and the other advanced disease, a conservative operation may be done on one side and nephrectomy on the other. But as a rule, bilateral operation for the removal of stones is preferable. If the kidney lies high, the author favors resection of the twelfth rib instead of the usual incision. In some cases most of the stone can be removed through a pyelotomy but some degree of nephrotomy will be necessary; in other cases extensive nephrotomy is necessary. It is most important that the stone or stones be completely removed; roentgen examination in the operating room is the only method of making sure that all stones are removed. Drainage by nephrostomy is the rule in all cases in which nephrotomy is done and the tube is left in for twelve to fourteen days. Irrigation of the renal pelvis through the nephrostomy tube is a routine postoperative measure. If any fragments of calculi are known to be present or are suspected, an acid solution should be used for the irrigation. If there is any evidence of infection one of the sulfonamides or penicillin is used as indicated; streptomycin will probably prove to be useful in some types of urinary tract infection. In order to prevent recurrence of calculus formation, the urine should be kept acid. The author considers that the best method is to give a liberal diet ensuring adequate vitamin intake and to acidify the urine by the administration of ammonium chloride in capsules; this drug can safely be used for indefinite periods, if renal function is adequate.

During prolonged immobilization decubitus calculi may develop, owing to partial decalcification of the skeleton and to stasis in the renal pelvis and calices resulting from the supine position. Decubitus calculi are characteristically multiple and difficulties in treatment result from their number and tendency to become impacted rather than their size. Two illustrative cases are reported. Decubitus calculi may be prevented by the administration of fluids and frequent movement in bed during period of prolonged immobilization. Urate calculi are often bilateral and nephrectomy should not be done unless it can be definitely demonstrated that only one kidney is involved. These stones are not very radiopaque and this makes operation for multiple stones difficult, as roentgen examination is not of much value. If the stones are completely removed, a diet relatively low in purins and alkalinization of the urine are of aid in preventing recurrence. Parenchymal calculosis is a rare condition; the author has seen but 2 cases, 1 of which is reported. The condition begins as proliferation of the tubular epithelium, which results in complete occlusion of the tubular lumen and formation of a hemo-

genous mass as the cells degenerate, on which calcium is deposited. Such calcified masses may reach the renal pelvis and be passed. The only treatment is to maintain an adequate fluid intake. In the case reported, the patient has been under observation seven years and is in general good health; she has passed one stone in that time after a few attacks of renal colic. 6 figures.

Management of Recurrent Renal Calculi. *James C. Kimbrough (Col., M.C., A.U.S.) and John N. Furst (Major, M.C., A.U.S.) Walter Reed General Hospital, Washington, D. C.* J.A.M.A. 137:219-25, May 15, 1948.

The material discussed in this paper was obtained from patients observed during a year ending Apr. 1, 1947. Only those treated by operative procedures are considered. A great many of these were paraplegic and orthopedic cases. Prolonged recumbency was a major etiologic factor. Fourteen of the 25 patients included in these reports had previous operations for the removal of calculi. The failure to completely remove all of the fragments is a definite cause. *Bacillus proteus* was the predominating infection. Other etiologic factors for recurrence of calculi such as fluid intake dietary management and early mobility of the patients are important. Roentgen studies during operation have been a great aid in enabling the surgeon to remove all parts of the calculi. Subcapsular caliceal resections gave satisfactory results in those patients who had had previous operations. Nephrostomy drainage, ureteral splint and pelvic irrigations with acid solutions were used freely. The essential points of operation are discussed. The operative treatment of renal calculi is but a phase in the management of this disease and the proper postoperative regimen is essential to prevent recurrence. 13 references. 8 figures.—*Author's abstract.*

Major Urological Surgery on Poliomyelitic Patients Confined to Respirators. Discussion on Etiology, Prophylaxis Against and Treatment of Calculi in Recumbent Patients. *Leo Brady and William J. Wilson, Johns Hopkins University, Baltimore, Md.* J. Urol. 61:381-88, September 1948.

Prior to this publication, there were records of only 3 poliomyelitic patients with respiratory paralysis who survived any type of major surgery. On 1 of these, an appendectomy had been successfully performed while the 2 others survived cesarean sections. The authors believe that their 2 patients are the first to be taken directly from the iron lung to the operating room and to survive major urologic surgery.

The 2 patients were sisters. The first was a 23 year old married woman who in addition to having paralysis of many muscles of all four extremities, had so much involvement of the diaphragm and intercostal muscles, it was necessary to keep her in the respirator. Eight months after the onset of her illness, there were encrustations over the entire bladder and roentgenograms showed hundreds, actually thousands of small stones filling the left kidney and ureter. It was impossible to

pass a catheter into the left ureter because of the bladder encrustations but a two-way catheter was inserted into the bladder and continuous irrigation started (modified tidal drainage). At first boric acid was used and, after the patient became accustomed to this, solution G, as advised by Suby and Albright. This measure was successful in getting rid of the bladder encrustations, and at a second cystoscopy it was possible to introduce a catheter for a few centimeters into the left ureter. Ureteral and renal lavage were then started with solution G. However, the catheter caused marked discomfort and slid out of the ureter in a few days; it is unlikely that solution G had any effect on the ureteral or kidney calculi. Shortly after this second cystoscopic examination, perhaps partly due to the dilatation of the lower end of the ureter, the patient started to pass stones and continued to do so daily, until within two months all the stones in the left kidney and ureter had been passed. The fact that by now the patient was able to stay out of the respirator at least part of the day and that she was made to sit erect for a short time every few hours, doubtless helped in enabling her to pass the calculi. Ten months later severe pain developed on the right side and roentgenograms showed two large stones caught low down in the right ureter. These calculi did not show in the roentgenograms taken four months previously, although they were probably there. The left ureter and kidney, which twelve months before had been filled with calculi, now appeared normal. The ureteral stones could not be made to pass by cystoscopy. The patient's condition grew steadily worse and the severe pain in the right side persisted. It became necessary to keep her constantly in the respirator. The nonprotein nitrogen increased. Even though she could not be outside of the respirator more than a few minutes without becoming cyanotic and losing consciousness, an operation was decided on.

The anesthetist made the following record: "The respirator was transferred to the operating room and was kept in operation until time for the administration of the anesthetic. Preparations had been made for intratracheal intubation in case it should be necessary. Sodium pentothal ( $2\frac{1}{2}$  per cent sol.) which was supplemented by nitrous oxide and oxygen, had been chosen for the anesthesia. The mechanism of the respirator was stopped and it was opened, giving access to an arm for the venipuncture and to the abdomen for the surgical procedure. An assistant removed the heavy rubber collar from around the patient's neck. When consciousness was lost, a face mask was applied and a flow of oxygen, 500 cc per minute and nitrous oxide 1000 cc per minute was started, using the absorption technique. The patient's feeble respiratory efforts were supplemented by gentle, rhythmic pressure on the bag during inspiration. After a few minutes, a pharyngeal airway was introduced without difficulty. A very light plane of anesthesia was maintained which combined with the muscle paralysis gave very adequate relaxation. As soon as the operation was completed, the respirator was

closed and its mechanism again started. The face mask was removed and patient was conscious within a few minutes."

A right inguinal extraperitoneal incision was made and continued around anteriorly almost to the midline. The upper of the two stones was easily removed but difficulty was encountered with the second. It was firmly wedged in the ureter a short distance from the bladder. Fifty minutes were required to complete the operation, the longest time recorded that a poliomyelitic patient with respiratory paralysis had been kept under an anesthetic. Nevertheless, the patient's condition was satisfactory at the end of the operation. A chemical analysis showed that the stones were composed entirely of ammonium phosphate. There were no traces of magnesium or of calcium. The convalescence was stormy, but at the end of two months, the incision had healed and the patient had no urinary symptoms. As had been anticipated, when the urinary complication cleared up, her respiratory difficulty improved and she no longer needed to stay in the respirator constantly. This patient is now home and, while there is danger of her developing further urinary complications, the regimen that is being followed lessens this possibility.

The second patient, 20 years of age, developed poliomyelitis one week after her sister did. All four extremities were paralyzed along with the diaphragm and intercostal muscles. She was placed in the respirator and not until two months later did she remain out of it as long as an hour. She was admitted to the Children's Hospital School a year after her illness had started. A roentgenogram showed several large stones in the right kidney. A catheter was passed into the right kidney and irrigation of the kidney pelvis with solution G started. Little hope was held that these stones could be dissolved but every effort was made to avoid surgery if possible. Fluids were forced and when the patient could be out of the respirator, she was placed in a semi-sitting position. It was impossible for this patient to either stand or sit up straight. Two months later, the patient developed severe pain in the right flank. A roentgenogram showed that one of the large stones in the right kidney had dropped into the ureter and apparently shut it off completely. The patient's condition became progressively worse, and she had to be constantly in the respirator. An operation was decided on, and the stone was removed through a right inguinal extraperitoneal incision. The question may be raised why the kidney was not explored at the same time and the renal calculi removed. Possibly this should have been done but this girl was at best a very poor risk and both the anesthetist and the operator (Brady) believed that the minimum should be done with the maximum speed. For six days after operation, the patient was quite comfortable. Large quantities of cloudy urine poured out of the incision and she no longer had any pain. However, on the sixth day, the colic in the right flank returned and the urinary drainage through the incision stopped. A roentgenogram showed that several stones had moved down into the ureter and again had blocked it. An immediate operation was necessary. Because of the potential difficulty of keeping the patient

breathing when placed in the usual kidney position an anterior approach was used. The peritoneum was once opened but due to the atrophy of the muscles, it was possible to remain extraperitoneal during most of the operation. Very little kidney cortex remained. Several large stones were firmly wedged in the ureter. It was decided to remove the kidney and enough of the ureter to include all of the stones. This may seem radical, particularly as the patient is in danger of developing trouble in the other kidney at a future date, but when the removed kidney was inspected, it was evident that a nephrectomy was the correct procedure. There was thick pus in the renal pelvis and calcareous deposits in the calices in addition to the large calculi. This patient was subjected to two operations but she was in better physical condition to stand a nephrectomy at the time of the second operation than she was at the first. These stones like those removed from her sister, were composed of phosphates but in this patient the phosphates were combined with magnesium and only traces of ammonium and calcium were present. Because of the infection, the wound took six weeks to heal. There is, however, no danger of hernia as this patient will never walk or sit up straight. She is now home and quite comfortable. She is on the regimen which is being carried out on all the patients in the Children's Hospital School with any respiratory difficulty due to poliomyelitis. These measures are particularly indicated for those who are or who have recently been in the iron lung.

At present in the Children's Hospital School, 8 patients are in respirators. Their ages vary from 15 to 33. None of this group is having renal colic at the present time. All have had negative roentgenograms. All except 2 of these patients can now be out of the iron lung for intervals varying from several hours to several days. As they become able to sit up and move around, the danger of stones forming becomes markedly decreased. It is in those who must spend all or a large part of their time in respirators that this danger is greatest. In order to lessen this danger, the following measures are being carried out on all patients in the iron lung unit of the Children's Hospital School and also on the 2 patients who withheld urologic surgery and who are now both home.

A daily fluid intake of at least 3,000 cc. is prescribed. There is a sufficient variety of food to ensure an adequate vitamin content. In order to lessen the calcium intake, only 1 glass of milk a day is permitted. Citrus fruits are given in only moderate amounts. Alkaline drugs such as soda bicarbonate or alkaline saline cathartics are not used. The first morning specimen of urine is tested with nitraime paper soon after it is voided. If it is alkaline, ammonium chloride is prescribed for from twenty-four to forty-eight hours. This will not acidify the urine when there is infection with urea-splitting organisms and may even be harmful. However, when this is not the cause, ammonium chloride may be very effective in lowering the pH. A special reason for keeping the urine acid is that most of the stones in recumbent patients are made up of phosphates. When infection develops, which is an ever-present dang-

er, sulfathiazole or sulfadiazine is prescribed but never for more than one week at a time. So far, there have been no cases in which stone formation could be attributed to sulfonamides but it would seem logical to suppose that in recumbent patients there would be an increased possibility of this occurring. Roentgenograms are taken at regular intervals. Nothing is more helpful in preventing the development of stone in recumbent patients than frequent change of posture. Infection, decalcification of bones, the pH of urine, hyperparathyroidism, dietary deficiency and probably several other factors play important roles but stasis is of prime importance in the formation of calculi in recumbent patients. It is difficult at best to see to it that paralyzed patients have their positions changed frequently. In the Children's Hospital School all patients in respirators are turned on each side for a definite period of time every day. At least once a day, the foot of the respirator is elevated to give the patient better drainage to the lower calices. Before any of these changes of positions are made, the patient is given large quantities of water so that the dependent calices may be better flushed out. 7 references. 2 figures.—*Author's abstract.*

Direct Manipulation of Ureteral Stones Through the Urethra. *William M. Copridge, Louis C. Roberts and Robert G. Rosser, Jr., Watts Hospital, Durham, N. C. J. Urol. 61:418-19, September 1948.*

Moderately large stones in the extreme lower portion of the ureter are often difficult or impossible to manipulate by ordinary cystoscopic methods. When surgery is resorted to, one of three routes is usually followed: (a) extraperitoneal approach through a Gibson or midline incision, which may be quite a formidable procedure in some patients; (b) by vaginal ureterotomy; (c) when the stone is extremely low or protruding into the bladder, by cystotomy and removal through the bladder. Stones of this type are more frequently seen in women. There are cases encountered in which any type of open operation may be undesirable. Occasionally these patients are acutely or dangerously ill. There are others in whom repeated operations may be necessary because of recurrences or multiple calculi higher in the ureter or in the renal pelvis. Under a low spinal or pentothal anesthesia a No. 21 Brown Buerger or Ravich cystoscope is passed and the bladder inspected with the observation telescope. Along the side of the cystoscope an alligator forceps 8 inches long is introduced directly into the bladder. The orifice on the affected side is located and the forceps manipulated so as to bring the tip into the field of vision. It is then placed in the orifice which is dilated by opening and closing the jaws. The stone is then grasped and removed. In the cases we have treated there have been no untoward results and only reasonable care seems to be necessary in carrying out the procedure. The method is presented because we believe it can be used to considerable advantage in the types of cases mentioned. 1 figure.—*Author's abstract.*

## 7. Hemorrhage and Shock

*See Contents for Related Articles*

## 8. Anomaly

Congenital Absence of One Kidney. *K. M. Bowden, Melbourne, Australia.* M. J. Australia 2:293-95, Sept. 11, 1948.

In true congenital absence of the kidney, there is no ureter and the trigone on the same side is undeveloped; in aplasia of the kidney, although the kidney is a functionless mass, the ureter is present. As congenital absence of one kidney is compatible with long life, as long as the other kidney functions, the diagnosis is often made only at autopsy. Two cases of congenital absence of the kidney are reported; in 1 of these cases, a 92 year old man, death was due to bronchopneumonia. At autopsy, the left kidney and left ureter were entirely absent and the trigone on the left side undeveloped. The autopsy also showed a typical carcinoma, hydronephrosis and degenerative changes in the solitary kidney. In the second case, a 60 year old man, death was due to methylated spirits poisoning; the left kidney and ureter were entirely absent in this case and the trigone not developed on that side. In both these cases, both adrenals were present, and in the second case bilateral suprarenal adenomas were present. The statement has been made that the corresponding adrenal is always absent in congenital absence of one kidney is evidently incorrect. Congenital absence of the kidney is usually due to complete arrest of development of ureteric bud from the wolffian duct; the embryologic development of the adrenal is independent of that of the kidney. A case of acquired atrophy of one kidney is also reported; in this case death was due to traumatic rupture of the opposite kidney; the ureter of the atrophied kidney and the bladder were normal. Congenital absence or atrophy of one kidney should always be excluded before any renal operation. 6 references. 1 figure.

## 9. Kidney and Capsules

The Posteriorly Located Renal Pelvis Associated with Ptosis. *William P. Herbst, Washington, D. C.* J.A.M.A. 137:775-77, June 26, 1948.

In many patients with ptosis of the kidney a posteriorly located renal pelvis is important in the production of symptoms sufficiently severe to warrant surgical procedures. Twenty-five patients with posteriorly located renal pelves have been observed. The 23 women and 2 men ranged in age from 17 to 68 years. The abnormality was bilateral in 3 cases; and was confined to the right side in 20 cases. Treatment was surgical in 19 cases; the following procedures being employed: (1) nephropexy, 4 (subsequent nephrectomy in 1 of these); (2) primary nephrectomy, 13; (3) lower pole resection, 2. Nephropexy provided a satisfactory result in only 1 case; nephrectomy in 12, the exception being a diabetic patient

and lower pole resection in both patients. A posteriorly located renal pelvis is believed to be the result of the location of the initial fusion of the ureteral bud and the metanephros, since such a kidney is ordinarily flat, in the prone position and lies on the posterior abdominal wall. Often a lateral or oblique roentgenogram is necessary for determination of a posterior pelvis. Urographically the diagnosis is suggested when there is a gun barrel effect to the pelvis and when the ureter is located laterally to the medial pelvic border. Removal of an anomalous vessel, or lower pole resection, is advisable when there appears to be a reasonable chance for a good result from such a procedure. When this is not feasible or when the ureter is of small caliber, nephrectomy is indicated. 7 figures.

*Renal Function in Early Life.* *R. A. McCance, University of Cambridge, Cambridge, England.* Physiol. Rev. 28:331-48. July 1948.

Presents a review of the literature on renal function in early life, which shows that in the newborn infant and in the first weeks of life, the kidney is not as effective an organ as it will later become. The glomerular filtration rates are lower than in the adult with the result that the clearances of those substances that are excreted chiefly by glomerular filtration are also lower. The tubules of the kidney of the newborn have not fully developed the capacity to excrete creatinine, diiodone or p-aminohippuric acid; but the ability of the tubules to reabsorb sodium, chloride and phosphate may develop more rapidly than the glomerular filtration, so that a large proportion of these ions are reabsorbed from the glomerular filtrate. The kidney of the newborn also shows little flexibility and shows little power to adjust to any disturbances of the relationships of water, sodium chloride and urea in the internal environment, although it excretes these substances normally under normal conditions. Further research on the functions of the kidney of newborn and young infants is necessary to determine its capacity and limitations more exactly. Under normal conditions, the kidney of the young infant will do its work normally but if dehydration, acidosis or other abnormal condition develops, or if a surgical operation is necessary, the kidney must be assisted to restore and maintain normal conditions in the internal environment. To do this effectively requires all the knowledge that the investigator can supply. 134 references. 1 table.

*Anuria Following Electroshock Therapy.* *K. F. Clute and G. W. Fitzgerald, Regina General Hospital, Regina, Sask., Canada.* Canad. M.A.J. 59: 426-31. November 1948.

A white farmer, 59 years of age, showing increasing agitation with episodes of depression, was given electroshock therapy in a dosage of 110 volts and 450 milliamperes for 0.3 second and experienced a typical grand mal convulsion. This was followed by extreme oliguria which, in spite of lavage of the renal pelvis, high spinal anesthesia and the therapeutic measures commonly employed, progressed to anuria, with death occurring on the seventh day. Urinalyses were normal prior to the shock therapy but subsequently showed albumin, epithelial and white blood cells and terminally

frank blood. At autopsy, the kidneys were enlarged and presented the same gross and microscopic appearances as in cases of crush syndrome. The cortex was pale, swollen and wet, contrasting with the medulla pyramids which were congested but of normal size. The principal microscopic features were eosinophilic granular debris in the proximal portion of the nephron, dilatation of the proximal convoluted tubules, desquamation and regeneration of the epithelium of the distal convoluted tubules which contained hyaline and benzidine-positive pigmented casts and polymorphonuclears, healed communications between these tubules and adjacent veins, and areas of edema of the interstitial tissue with fibroblastic proliferation. It is suggested that the anuria may have been due either to damage of the epithelium of the distal convoluted tubules by the precipitation of myohemoglobin released from skeletal musculature (i.e., a pigment nephrosis) or to renal cortical anoxia consequent upon spasm of the renal arterial tree, especially in its peripheral portion. If the latter theory be correct, then the interruption of sympathetic impulses to the kidneys by high spinal anesthesia or by splanchnic block would appear to be rational therapy. If the patient can be kept alive during the period of anuria by such measures as the use of the artificial kidney or peritoneal dialysis, the ultimate prognosis may be considered good, since structural damage of the kidneys is slight and the epithelial regeneration which is evident gives promise of a restoration of renal function. 33 references.—*Author's abstract.*

Severe Acute Renal Insufficiency with Recovery. *E. E. Muirhead and C. S. Fromm, Dallas, Tex.* J. A. M. A. 137:1378-81, Aug. 14, 1948.

The syndrome of acute renal insufficiency has many causes but always a high mortality. Various treatments have been used, all endeavoring to clear waste products from the body and sustain the patient over the eight or ten days required for regeneration and recovery of the damaged renal tubules. The clinical symptoms indicate a division of the disease into the phases of renal damage, renal insufficiency and diuresis. The high mortality of the disease in the past has been largely a result of improper management, frequently giving the patient a greater water, water-salt or salt intake than could be handled by the damaged kidney. Modern treatment is based on the main changes of the three clinical phases. Blood transfusions are given during the first phase because of the frequently associated hypotension. Plasma or albumin solutions may be used in place of blood but care must be exercised not to overdilute the circulatory red blood cells. Treatment during the phase of renal insufficiency is divided into three stages. Practically normal hydration is maintained by the daily administration of 1,000 cc. of fluid to replace the insensible loss plus a volume equal to the urinary output. This fluid has a formula of approximately 1 calory per cubic centimeter. Advanced acidosis is prevented by administration of 4 to 6 Gm. of sodium bicarbonate as indicated. No effort is made to reduce the blood urea or to force the kidneys to provide urine. Water and salt are replaced as indicated by the urinary output in the third stage of diuresis, patients being permitted to regulate their own diet and water-salt intake. This treatment has elimi-

nated necessity for artificial dialysis by peritoneal irrigation, etc. and has been successful. A case of severe acute renal insufficiency following resection of the bladder neck with the resectoscope is reported in a patient with complete functional transection of the lower dorsal spinal cord. Severe shock with blood pressure of 50/30 developed one hour after operation. Blood samples showed a prominent hemoglobinemia resulting from a hemolytic reaction. Severe renal failure developed characterized by marked oliguria. Treatment followed the three phase system. Blood transfusions totaling 4,500 cc. were given in eight days. An overload of water and salt was carefully avoided and high caloric fluid and fruit juices given orally with vitamin B parenterally. Sodium bicarbonate was given orally to combat acidosis. Daily water-salt replacement was somewhat complicated by the Texas heat during May and June, diarrhea and edema of the paralyzed lower limbs. The patient was able to adjust his own water-salt diet after the sixteenth day and satisfactory recovery followed. 20 references. 1 table. 4 figures.

The Treatment of Acute Renal Insufficiency. *E. E. Muirhead and J. M. Hill, Baylor Hospital, Dallas, Tex.* Surg., Gynec. & Obst. 87:445-56, October 1948.

Acute renal insufficiency may result from various causes but the most common seems to be prolonged hypotension usually due to oligemia. In the past the mortality rate for this nephropathy has been extremely high (80 to 90 per cent). The clinical course may be divided into three phases: (1) hypotension; (2) renal insufficiency (characterized by oliguria or transient anuria); (3) diuresis (characterized by a twenty-four hour urine volume of 5 to 10 liters with a prominent salt output at times). The renal lesions are associated with tubular degeneration or necrosis. Regeneration is well advanced by the eighth day. The mortality rate has been markedly lowered by altering the treatment according to the abnormalities of each phase. During phase 1, blood transfusions are given for the oligemia. During phase 2 stringent observance of the fluid balance is conducted. The insensible water loss is estimated (1,000 to 1,500 cc.) each day the water intake is limited strictly to this amount plus a volume equal to the urine volume of the day before. Complete starvation is prevented by making this fluid intake into a salt-poor high caloric liquid formula plus water soluble vitamins. Severe acidosis is prevented by means of periodic doses of sodium bicarbonate (4 to 6 Gm.) by mouth or by rectum. Excessive sodium bicarbonate intake is averted. Phase 3 requires an aggressive replacement of water and salt. Three to six days after the peak of diuresis the patient can usually be allowed to care for his own intake. Various grades of severity of this condition are emphasized. Criteria for ascertaining the relative severity are discussed. It seems evident that relatively milder cases may become fatal by improper management. Complications due to improper management may include: prolonged hypotensive state of the first phase may lead to other fatal complications despite renal recovery, as severe brain damage; insufficient blood replacement may cause

grave complications (mental aberrations, coma, pulmonary edema, death); failure to replace insensible loss may interfere with the phase of diuresis; improper replacement during the diuresis may cause advanced dehydration. 31 references. 2 figures.—*Author's abstract.*

The Management of Anuria in Acute Mercurial Intoxication. *Alfred P. Fishman, Irving G. Kroop, H. Evans Leiter and Abraham Hyman, New York, N. Y.* New York State J. Med. 48:2393-96, Nov. 1, 1948.

In the management of a case of anuria due to absorption of mercury, distinction must be made between the early anuria due to decreased circulating blood volume (vomiting, diarrhea and shock) and the later anuria which persists despite a normal circulating blood volume and is due to tubular damage. The administration of large volumes of fluid may terminate the anuria due to shock but may cause pulmonary edema if the damaged kidneys cannot elaborate urine. When it is established that the anuria is caused by intrinsic renal damage, the authors advise careful, calculated fluid replacement based on daily loss. Electrolyte balance is controlled by daily determinations of levels in blood. Fluids, alkalis and sodium chloride are administered by mouth or hypodermoclysis in preference to the intravenous route. In order to use the endogenous protein breakdown as a guide to the course of the azotemia, exogenous protein is avoided. A calorically adequate diet is given consisting only of carbohydrates and fats.

This regimen is undertaken with the understanding that spontaneous diuresis may be expected to occur in acute toxic renal insufficiency between the eighth to twelfth days. If diuresis does not occur by then, artificial dialysis may be resorted to in order to temporarily ameliorate symptoms. Two cases are used to illustrate the management of acute anuria due to mercury intoxication. The similarity to other instances of acute anuria is presented. In the first case, diuresis started on the eighth day following the onset of anuria. The diuresis could be ascribed to no specific factor. In the second case, diuresis occurred on the twelfth day, seven days following the use of the Kolff artificial kidney. The hazards of ascribing resolution to a specific form of therapy are stressed. The difficulties in evaluating new forms of therapy are emphasized. 30 references. 1 figure.—*Author's abstract.*

The Treatment of Experimental Uremia by Intestinal Lavage. *Beverly H. White, St. Petersburg, Fla. and Henry N. Harkins, University of Washington Medical School, Seattle, Wash.* Surgery 24:90-96, July 1948.

Results of 18 experimental lavages of isolated intestinal loops in dogs made uremic by bilateral nephrectomy are presented. Sections of intestine 20 to 40 inches long were isolated, each end sutured to the abdominal wall and skin so as to make a Thiry-Vella fistula, and continuity restored by an end to end anastomosis. Irrigation was intermittent, at a rate of flow of 26 to 66 cc. per minute, and commenced twenty-one to thirty hours after nephrectomy. Single irrigation periods were two and one-half to ten and one-half hours. Blood urea nitrogen and nonprotein nitrogen determinations

were made twice daily in the control animals and at the end of each irrigation period in the irrigated animals. Hematocrit values were determined at the same time. A weight loss of 11 to 45 per cent occurred in both irrigated and control animals, the former losing an average of 8 per cent more than the latter. Survival time of control dogs after nephrectomy averaged seventy-three hours, terminal blood urea nitrogen levels averaged 193 mg. per cent and the average urea nitrogen rate of increase was 2.5 mg. per cent per hour. Uremic symptoms developed in most controls thirty-six to forty-eight hours after nephrectomy and were quite evident about sixty hours postoperatively. The survival time of the irrigated dogs averaged only 81 hours, terminal blood urea nitrogen averaged 144 mg. per cent and the average rise of urea nitrogen was 1.6 mg. per cent per hour. The blood urea nitrogen remained level or was lowered 1 to 9 mg. per cent during the actual irrigation in 44.5 per cent and increased 1 to 25 mg. per cent in 55.5 per cent of experiments. Greatest efficiency of urea removal was 14 mg. of urea nitrogen per inch of intestine per irrigation hour. Best results with hypertonic fluids were obtained with 3 per cent saline solution alone or with 3 per cent sodium sulfate added to the wash fluid. Some urea seemed to be actively excreted into the intestinal lumen during the rest period. Hypertonic solutions are believed to accelerate excretion by causing a physical or chemical irritation of the mucosa rather than by a pure osmosis. The excretion is apparently a constant slow process and not appreciably expedited by a high blood urea level. A high urea content in the wash fluid was found to decrease the amount of urea removed from the blood stream. The hematocrit remained level or dropped 1 to 3 points in fifteen and rose in three washing experiments, showing that water was extracted from the wash fluid even though hypertonic. These experiments indicated that intestinal lavage did not significantly prolong life as compared to control animals, probably because of a severe electrolyte disturbance. Considerable urea is removed by this method but the question of electrolyte balance requires solution. 23 references. 2 tables. 1 figure.

**Peritoneal Irrigation. Successful Use in the Treatment of a Case of Renal Failure Due To Mercurial Nephrosis.** *S. A. Localio, J. L. Chassin and J. W. Hinton, New York Postgraduate Medical School and Hospital New York, N. Y. J.A.M.A. 137:1592-96, Aug. 28, 1948.*

Peritoneal irrigation was successfully applied to the prevention of uremia in a 32 year old white female with anuria from mercurial nephrosis. The technic used was that of Fine, Frank and Seligman (1946). A rubber catheter was inserted through a paracostal incision in the right flank to serve as the inlet, while a stainless steel sump drain was placed into the cul-de-sac through a McBurney incision in the left lower quadrant as the outflow. It was connected to a suction motor. The rate of flow was kept at about 2,500 cc. per hour for one day and the rate was slowed to 1,500 cc. per hour. The patient had no pain throughout six days of irrigation. Penicillin (50,000 units every three hours) was given intramuscularly, and streptomycin (333 mg. every four hours) was given orally, for twelve days.

The patient on admission was not moribund but the prognosis was poor despite the use of BAL. She was not comatose or delirious. Protein was not restricted during irrigation, because the dialyzer removed nitrogenous end products of protein metabolism. Over 75 Gm. of urea were removed in the five and one-half days of operation. The worst difficulty was the treatment of acidosis in the presence of hypoproteinemia and dependent edema. The patient was given intravenous or oral sodium bicarbonate as needed. This method should be used only when conservative treatment appears useless. The great danger is peritonitis. Seven months postoperatively, the patient still had intermittent mild azotemia. At ten months the blood chemistry was normal. She could carry on household duties with no obvious physical or mental difficulty. 9 references. 2 tables. 1 figure.

**Discussion on Advances in the Treatment of Uraemia. Transperitoneal Dialysis. Ronald W. Reid. Proc. Roy. Soc. Med. 41:409;413-18, July 1948.**

Although uremia is easily recognized, the actual nature of the condition has not been determined and treatment has been unsatisfactory. In the treatment of uremia, it is important to remove the cause, to reduce the load on the kidney, to assist or to take over the function of the failing kidney in order to aid recovery and to relieve symptoms without prejudicing recovery. To determine the cause, a careful survey of the patient is necessary with special attention to urinary tract infections or obstructions. To reduce the load on the kidney, protein intake should be limited and carbohydrates given in sufficient quantities to prevent the break down of body proteins; the administration of large amounts of fluids, especially intravenously, is contraindicated. To assist the failing kidney, it is important to assure an adequate oxygen supply and if there is any serious degree of anemia blood transfusions should be given. Recently methods of contacting the body fluids across semipermeable membranes to remove diffusible toxins and to restore the normal constitution of the extracellular fluids have been devised. The methods now employed are peritoneal lavage and the conduction of blood through a semi-permeable tube immersed in a suitable solution. Intermittent peritoneal lavage has been employed by the author in cases of uremia in which there was some hope of recovery. Six cases are reported; 3 of these patients (1 with prostatic carcinoma) died; in the 3 patients who recovered the evidence indicated that the peritoneal dialysis was not chiefly responsible for this result. It was showed that urea and presumably other toxic products can be removed from the blood stream by peritoneal dialysis, and that this results in clinical improvement that cannot be translated into statistical terms. It has also been showed that the maintenance of the fluid electrolyte balance is of greatest importance. The method of intermittent injection and withdrawal the author considers better and safer for peritoneal dialysis than continuous perfusion. With the intermittent method, an assessment of results can be made between each perfusion. The composition of the fluid used is of great importance. The composition of this fluid must be such that waste products diffuse into it rapidly, and that the electrolyte and water balance of the extracellular

fluid are not grossly altered. It must have an osmotic pressure the same or nearly the same as that of the plasma and must be adjusted to combat acidosis and alkalosis. Of various solutions employed, the author found that 5 per cent glucose in saline gave the best results. Peritoneal dialysis is still in its infancy as a method of treating uremia; further developments may establish it as a most potent therapeutic method. 10 figures.

Dialysis of Blood in the Treatment of Uremia. *E. M. Darmady*. Proc. Roy. Soc. Med. 41:418-19, July 1948.

Dialysis of blood may be obtained by the use of a machine that gives a free continuous flow of blood from the patient, through the dialyzing system and back to the patient again. In the machine used by the author the in and out flow of blood is controlled by synchronized pumps, that are designed to inject 10 cc. for every complete rotation of the drum to insure an even distribution of blood over the dialyzing surface. The blood is withdrawn from the radial artery of the patient and returned to a suitable vein. With the use of this method of dialysis it is necessary to heparinize the patient with 200 to 300 mg. heparin before the treatment is begun. If sudden hemorrhage occurs blood transfusion and protamine sulfate will adequately antagonize the action of heparin. The composition of the fluid used is the most important factor in successful dialysis; usually the fluids used are of a simple electrolyte pattern containing salts isotonic with normal blood, with glucose added to raise the osmotic pressure. Such fluids have been used successfully in the dialysis of blood in some cases but they have one important disadvantage; glucose diffuses into the blood so rapidly that its osmotic action is not maintained and this leads to a shift of water from dialyzing fluid into the patient's circulation. The author is of the opinion that a nondialyzable substance should be included in the dialyzing fluid to counteract this tendency; his aim is to produce a fluid that is iso-osmotic as well as isotonic for dialysis of blood. The rotating type of dialyzer described is efficient but it is possible that a less bulky and more portable type of dialyzer that is equally efficient may soon be designed. 2 figures.

The Treatment of Renal Insufficiency in the Surgical Patient. *Frederick A. Coller, Kenneth N. Campbell and Vivian Job, University of Michigan Medical School, Ann Arbor, Mich.* Ann. Surg. 128:379-90, September 1948.

For the patient with acute renal insufficiency of the lower nephron type, the therapy must be aimed at maintaining survival. The interval prior to the recovery of renal function has varied from seven to fourteen days. The simple but successful conservative plan of management for acute renal insufficiency that is presented is based upon the time interval necessary for renal tubular healing following injury and upon the premise that the patient will be maintained in a satisfactory clinical condition during this interval by extremely conservative measures. During the phase of shock, hemolysis, injury, etc. the usual measures are employed. When renal insufficiency becomes manifest, a blood sample is obtained for re-checking

of the original cross match; extra-renal parenchymal urinary tract obstruction is excluded; and the total fluid intake is limited to the daily calculated insensible loss until the urine output is adequate (in the afebrile patient, 1,000 cc. to 1,800 cc. of water per os or 5 per cent glucose in distilled water intravenously). Periodic blood NPN and carbon-dioxide combining power determinations are made routinely and if the latter reaches levels of 40 volumes per cent, correction is achieved through the use of sodium bicarbonate orally or sodium lactate (one-sixth molar) intravenously. The development of the signs and symptoms of tetany are allayed by administering calcium gluconate or levulinate, 10 cc. daily, during the phase of renal insufficiency. Although the salt content of the diet should be limited to 200 to 800 mg. per day until diuresis occurs, no untoward effects from either high protein intake or restriction have been observed. When recovery diuresis, the third phase, appears, a paradox may occur. While the urine output increases daily, abnormal and electrolyte losses in this urine may jeopardize the patient's life because of acute dehydration and hypopotassemia. Therefore therapy directed at accurate replacement of urinary losses of sodium, potassium and water is mandatory and replacement is achieved by means of Ringer's solution intravenously and/or a 0.5 per cent salt solution per os ( $\text{NaCl}$  4.0 Gm. per liter plus  $\text{NaHCO}_3$  1.0 Gm. per liter). Once recovery diuresis has become manifest, the daily increment in urine output receives careful attention; when the output is 5 liters or more daily, an equivalent amount of Ringer's solution is administered intravenously, any difference between output and intake being paralleled by an oral intake of salt solution equivalent to the amount of urine passed at each voiding. After urine output reaches normal levels, renal function tests are advisable since they reflect the degree of recovery. The blood NPN may not return to normal levels for some twenty-eight to thirty-five days after the onset of renal insufficiency. Six cases are presented which demonstrate the efficacy of this type of management; 4 additional cases are reviewed because they represent previous fatalities and because the therapy employed was in direct contrast to present management. 6 references. 2 tables. 7 figures.

Report of a Case of Lower Nephron Nephrosis Treated by Renal Capsulectomy and Peritoneal Lavage, with Recovery. A Modification of the Method of Peritoneal Lavage. *Horace L. Weinstock and G. A. Nitsche, Jr., Hahnemann Medical College and Hospital, Philadelphia, Pa.* J. Urol. 60: 577-80, October 1948.

A man aged 33 had an extensive graft from a donor area of the tibia for an ununited fracture of the femur. The operation took over five hours and a transfusion of 500 cc. of whole blood was given during the procedure. This blood was later proved to be incompatible. Oliguria developed. Spinal anesthesia was tried without results to control subsequent anuria. On the fourth day a renal capsulectomy was performed and at the same time a single mushroom catheter was inserted deep into the pelvis and directed towards the midline. A Y tube was connected to the free area of the tube with one end

for the intake of fluids and the other to the drainage bottle which had a suction pump in the circuit. Biopsy taken from each kidney revealed evidence of distal convoluted tubular destruction. All the constituents used were obtainable, sterile; they were added together in a suitable container to make a concentrate as follows: 100 mg. of heparin; 400 cc. Hartman's solution concentrate; 200 cc. 50 per cent glucose; 1 Gm. streptomycin; 200,000 units penicillin; sterile water to make 1,000 cc. Two hundred cubic centimeters of the concentrate added to 1,800 cc. of sterile distilled water will make an aliquot of flush fluid. This obviously is not difficult and with the simplification of method, as devised by the authors, this procedure lends itself to use by small institutions making possible the wider usage of peritoneal flush.—*Author's abstract.*

The Artificial Kidney. Its Clinical Application in the Treatment of Traumatic Anuria. *E. G. L. Bywaters and A. M. Joekes, Post-Graduate School of Medicine, London, England. Proc. Roy. Soc. Med. 41:420-26, July 1948.*

Reports the use of the artificial kidney of Kolff in the treatment of 12 cases of uremia; 2 of these cases were treated for less than an hour, in 1 case because of unsatisfactory cannulation; in the other case the patient was moribund when the treatment was started. Of the remaining 10 patients, 2 survived, probably because of the dialysis, although this is difficult to prove except by statistical analysis of a larger series of cases. One of these was a case of posttraumatic anuria, the other postoperative anuria. Furthermore, in 2 cases death was due to complications present before dialysis was attempted: Pyocyanus infection in 1 case and bilateral bronchopneumonia in the other. One death was probably related to the dialysis, as subdural hemorrhage occurred which may have been caused by the heparinization necessary with the use of the artificial kidney. There was no other case of hemorrhage in this series, either from recent operative wounds in 1 case or from a recently separated placental site in another. It has been found that the dosage of heparin can be reduced from 1 Gm. to 500 mg. without clotting in the artificial kidney; if necessary the coagulation time can be brought to normal in a few minutes by the administration of protamine sulfate. The dialyzing fluid employed contained 600 Gm. NaCl, 1,500 Gm. glucose, 20 Gm. NaHCO<sub>3</sub> and 40 Gm. KCl in 100 liters of tap water. From their experience with the artificial kidney, the authors conclude that dialysis by this method is indicated chiefly in those conditions in which recovery of renal function can eventually occur, especially in cases in which the tubules but not the glomeruli are damaged. Lower nephron disease, in which recovery often will not occur spontaneously, will probably be found to be the chief indication for the use of the artificial kidney. 14 references. 4 tables, 6 figures.

The Urinary Tract as an Obstetrical Problem. *Walter A. Ruch, Memphis, Tenn.* South. M. J. 41:916-20, October 1948.

Of all the complications of pregnancy, those involving the urinary tract are perhaps the most neglected. The safety of the patient depends upon the presence of sufficient normally functioning kidney tissue to carry on without embarrassment all the demands placed upon it by pregnancy. If the normally functioning tissue is inadequate for this purpose, the pregnancy should be terminated in order to safeguard the life and future health of the mother. In 1939, 100 consecutive patients were studied in regard to the incidence of retention following prolonged labor, as well as with respect to the type and duration of analgesia, to operative delivery and to postpartum pyelonephritis. The patients were catheterized on the third day postpartum and repeatedly thereafter until the bladder retained less than 4 ounces of urine. Forty of the 100 patients had 4 ounces or more of urine in the bladder on the third postpartum day. Of the 40, 15 were unable to void by the third day and the other 25 had 4 ounces or more of residual urine immediately after voiding. In addition, 16 patients had from 1 to 3 ounces of residual urine after voiding. It is of interest, also, that 10 of 100 patients who were catheterized during delivery had positive urine cultures, whereas 90 had negative cultures. Of the 90 whose cultures were negative at the original catheterization, however, 80 had positive cultures when catheterized again on the third day after delivery. The only logical conclusion to be drawn from such findings is that organisms unavoidably introduced into the bladder during the delivery catheterization multiply and flourish in the residual urine of the sluggish puerperal bladder. It is obvious, therefore, that every effort should be made to stimulate a return of normal function in the postpartum bladder at the earliest possible moment.

From 1940 to 1943, by using better care during labor and the puerperium and by the use of intermittent drainage for excessive postpartum retention, the incidence of postpartum pyelonephritis was greatly reduced. Since this method caused irritation of the urethra, the use of continuous drainage and lavage were introduced and a greater degree of improvement was noticed. Some degree of dilatation of the ureters and hypertrophy of the ureteral sheath may be observed in the majority of pregnant and recently parturient women. Also, a considerable number have congenital anomalies of the kidneys and ureters. These anomalies are responsible for many of the urinary tract infections of pregnancy and often have serious consequences. Usually, they do not manifest themselves symptomatically. The surest method of obviating complications incident to either of these conditions is by having pyeloureterograms made of every pregnant patient. Not infrequently, patients develop infections of the urinary tract during labor or delivery, through the obstetrician's use of nonsterile catheter lubricants, trauma to the urethra by the insertion of overlarge catheters, or by over-insertion of the catheters. These infections may be prevented by more thorough asepsis and more care in performing catheterization. There is no question to the assurance that proper intrapartum and postpartum care will minimize the incidence of postpartum pyelonephritis. 5 references.—Author's abstract.

Ureteropelvic Obstructions. Symptoms and Treatment. Report of Seventy Cases, Sixty-Two Operations. *Roy B. Henline and Cecil J. Hawes, New York, N. Y.* J.A.M.A 137:777-84, June 26, 1948.

An obstructive renal syndrome may be indicated by the presence of gastrointestinal symptoms even though the urine may be normal. Obstruction at the ureteropelvic junction is diagnosed by retrograde pyelography and a ten minute roentgenogram. Since most ureteropelvic obstructions are caused by narrowing of the lumen even though aberrant vessels, bands and adhesions may be obvious, the most careful inspection is required at operation in order to insure correction of all obstructive factors. Plastic operation are in order only if the remaining renal tissue is sufficient to sustain life. The Foley Y plastic operation has been the most successful procedure but only when combined with nephrostomy drainage and the employment of a splinting ureteral catheter for six weeks. Evaluation of results should be made only after several years of follow-up and should be based on evidence (retrograde pyelogram and delayed roentgenogram) of improved drainage of the renal pelvis as well as on the relief of symptoms. Sixty-one and six-tenths per cent of the 52 patients with ureteropelvic obstructions were between 20 and 40 years of age. Gastrointestinal symptoms were noted in 20 patients. Voided urine was normal in 19. Although urinary symptoms occurred in 22, 46 experienced renal pain varying from backache to renal colic. Some grade of hydronephrosis was evident preoperatively in all seventy pelvis, grade II being the most common; postoperatively 11 were normal, 27 showed grade 1 dilatation and most of the balance showed improvement. Ten of the 13 patients who preoperatively had diminished renal function, showed improvement after operation. In 44 cases the ureteropelvic obstruction was caused solely by narrowing of the lumen; in 2 cases by bands, adhesions or aberrant vessels; in the remaining 16, by a combination of these factors. Ten of the 52 patients had bilateral operations. Forty-five Foley Y plastic operations were done on 39 patients, 9 of whom required resection of the redundant pelvis. In 27 of these patients, the nephrostomy wounds stopped draining after forty-eight hours, indicating the reestablishment of the normal drainage route. Thus far, 2 patients in this group have subsequently required nephrectomy. Recent inquiry has disclosed that 34 patients are symptom-free. Of the 12 patients with renal calculi preoperatively, 2 have had a recurrence since operation. However, the incidence for renal calculi following the 45 Foley Y plastic operations was 11.1 per cent; and prolonged nephrostomy drainage is considered responsible. There was no operative mortality but 1 patient died of uremia and cardiac disease two and one-half years following operation and 1 died of uremia four years after operation. However, in both instances, kidney damage was serious preoperatively. Other plastic procedures were not successful, a satisfactory result being obtained in only 2 of the 13 cases so treated. 11 references, 5 tables, 3 figures.

Metastases to Endometrium and Skin from Carcinoma of Kidney. Report of Case and Review of Literature. *Max Ratner and Clarence Schneiderman, Jewish General Hospital, Montreal, Que., Canada.* J. Urol. 61:389-92, September 1948.

The authors present an unusual case of metastases to the endometrium and skin from a carcinoma of the kidney. Reference to the former site is found in only 1 previous case and to the latter in 8 cases in urologic literature. A 65 year old woman had a right nephrectomy performed for carcinoma of the kidney. The specimen showed invasion of the renal capsule and capsular vessels by adenocarcinoma. She received a course of radiation therapy to the operative site. The patient was admitted six months later for vaginal bleeding, at which time physical examination revealed two circumscribed masses in the skin, measuring 5 cm. and 3 cm. in diameter, and situated just to the left of the umbilicus, and one in the right midaxillary line. Complete excision of the nodules was performed, and pathologic examination revealed metastatic tumor of renal origin. A dilatation and curettage of the uterus revealed endometrial curettings, with a histologic diagnosis of tumor resembling hypernephroid carcinoma of the kidney. The patient expired nine months following nephrectomy. Autopsy revealed metastases to both adrenals, left femur, superior mediastinal lymph nodes, and myometrial invasion by tumor, of renal origin. The lungs showed microscopic foci of metastatic tumor involvement, with no gross evidence of tumor noted. 9 references. 1 figure.—*Author's abstract.*

Cancer of Kidneys, Adrenals and Testes. *George F. Cahill, New York, N. Y.* J.A.M.A. 138:357-62; 415-25, Oct. 2 & 9, 1948.

The usual cancer of the kidney originates from the renal parenchyma or from the epithelial lining of the pelvis. Parenchymal renal carcinoma is a disease of middle age. It occurs more frequently in the male. The symptoms include hematuria, pain in the flank and a mass in the flank. Hematuria is the most frequent and important symptom and occurs in 70 to 80 per cent of the cases. Urinary difficulties may arise from a blood clot in the bladder and there may be coexistent prostatic hypertrophy. Weakness and loss of weight become more frequent as the disease progresses. There may be fever. The clear cell carcinoma is the most frequent type of tumor. Years may pass before it spreads. The most usual place of metastases is in the lung capillaries. The granular cell carcinoma grows more rapidly and is more malignant than the clear cell. It occurs more often in the older group. In all cases of hematuria, unless the cause has been determined, there should be a complete cystoscopic examination. Retrograde pyelograms should be done. The use of cytologic methods in all urinary tumors is essential, particularly when diagnosis is difficult. The only corrective procedure for renal parenchymal carcinoma is early surgical removal of the involved kidney and capsule. Ligation and division of the renal vessels are the ideal first steps in the surgical removal. Clear cell tumors have a much higher percentage of freedom from recurrences than do the granular or mixed tumors. Carcinoma of the renal pelvis is the same as the epithelial cancers

of the ureter and bladder. They are less frequent than parenchymal tumor, and occur somewhat more often in males. About 50 to 70 per cent of these tumors are papillary. More than half the papillary tumors are malignant. Squamous cell carcinoma is less frequent and occurs with irritant lesions. Infiltrating undifferentiated carcinoma occurs infrequently. Papillary tumors often metastasize down the ureter and through the lymphatics. The chief symptom of tumors of the renal pelvis is hematuria. Pain is infrequent. General symptoms appear only late in the disease. No symptoms are diagnostic. Investigation requires cystoscopy and retrograde pyelograms. Cytologic urinary studies are often of great value. The treatment of pelvic tumors is complete ureteronephrectomy. With papillary tumors the prognosis is good. The other types have a poor prognosis because of early invasive tendencies. 5 references, 4 figures.

Tumors of the various layers of connective tissue, the blood vessels, lymphatics and nerve structures of the adrenal gland are extremely rare and the course of most of these tumors is extension and death. Tumors of the ganglion cell are nonhormonal and occur most often as the very malignant immature sympatheticoblastomas or less often as the relatively benign neurocytomas of adults. Sympatheticoblastomas of infancy have a poor prognosis because of failure to recognize the disease before metastasis. The only correction is avoidance of trauma and early removal. Cytologically nonhormonal tumors of the medulla are graded according to the age of the sympathetic cells and their activity. The pheochromocytomas are hormonal tumors of the adrenal medulla and the syndrome was initially termed paroxysmal hypertension. These tumors show excess of pheochrome cells with increase of interstitial stroma and ganglion cells. Tumors of the adrenal cortex are classified as follows: (1) tumors with no recognizable hormonal changes in the patient; (2) tumors with changes through hormonal influence on the secondary sex characters; (3) tumors with changes through hormonal influence on various metabolic processes; (4) tumors with changes from hormonal influences, both of the adrenogenital type and the Cushing syndrome of the adrenometabolic type. Testicular tumors are more frequent in undescended testes and occur most often in the period of maximum sexual activity. There may be a history of trauma. These tumors may arise from any of the three germ layers. All such tumors are cancerous. The common ones usually form metastases by way of the lymphatics. Seminomas arise only from the seminal cells. They usually do not invade or destroy tissue planes or adjacent structures and scrotal invasion is rare. Other testicular tumors include embryonal carcinoma, choriocarcinoma, teratomas and teratocarcinoma. In most testicular tumors the presenting sign is enlargement of the testis. If the tumor is in an undescended testis the first sign may be a mass metastasis. Tumor of the testis must be differentiated from tuberculosis, syphilis, hydrocele and spermatocele. Hormone tests in the urine of patients are useful in diagnosis. If no metastases are demonstrable in testicular tumor surgical treatment is advisable. Simple orchidectomy offers a cure in the noncancerous adult teratomas or in an early cancer that has not extended to the lymphatics. The value of preoperative radiation is uncertain. Roent-

genotherapy is of primary importance in the management of seminoma of the testis. All neoplasms of the testis are cancerous, with the prognosis for teratoid carcinomas poorer than that for seminomas. The radical operation in selected cases gives the highest percentage of relief. 42 references, 16 figures.

*Renal, Vesical, and Prostatic Cancer. London Survey.* Brit. M.J. 4589: 1076, Dec. 18, 1948.

An annual statistical survey of cancer cases in London hospitals is made by the Clinical Cancer Research Committee of the British Empire Cancer Campaign, a different organ or body region being taken each time. A detailed analysis of 126 cases of renal, 451 of vesical and 399 cases of prostatic cancer is presented this year. In the first group, the average age was 57 years and males outnumbered females 2 or 3 to 1. Hematuria was the first symptom except in the occasional case of renal teratoma when the tumor may be found before symptoms develop. The primary tumor was silent in 1 of 10 cases of renal cancer, first symptoms being from metastases. Though nearly 75 per cent of cases consulted a doctor during the first three months and 75 per cent of these were promptly hospitalized, tumor growth was so rapid that 29.5 per cent had recognizable metastases upon admission. Males with vesical carcinoma averaged 63½ years and females 66 years of age. The first symptom in 69 per cent of cases was hematuria. Only 54.5 per cent of cases consulted a physician during the first three months and 77.8 per cent were promptly referred to hospital but 11.9 per cent were treated symptomatically for over three months. The highest incidence of prostatic cancer was in the 65 to 70 year age group. The first symptom was difficult or painful urination in 60 per cent of cases but in 21 per cent it was referred pain or some other symptom of possible metastases. A physician was consulted by 53.6 per cent of cases during the first three months but the disease was more than six months old in about 20 per cent of these when first seen. Of cases consulting a doctor, 58.3 per cent were promptly referred to hospital but 17.3 per cent received symptomatic treatment for over three months. Tables are presented showing the five year survival rate, methods of treatment, cause of death and autopsy findings.

*Lymphosarcoma of the Kidney.* Thomas E. Gibson, San Francisco, Calif. J. Urol. 60:838-54, December 1948.

Lymphosarcoma of the kidney is a misnomer, since primary involvement of this organ probably never occurs. Secondary involvement of one or both kidneys by malignant lymphomas and Hodgkin's disease is frequent, and deserves the attention of the urologist because of the clinical manifestations produced by involvement of the genitourinary organs. Involvement of the kidneys may occur either by metastasis or by direct invasion from neighborhood foci of the disease. The clinical manifestations fall into three groups: (1) those in which there may be initial or incidental symptoms of renal colic as a result of constriction or strangulation of the ureter by retroperitoneal lymphoma; (2) those in which the kidney is

involved to such a degree that they are mistaken for primary renal neoplasms; (3) those in which the clinical findings point to a primary retroperitoneal lymphosarcoma with secondary involvement of the kidneys. The 3 cases reported are illustrative of each of these groups.

Renal involvement by lymphoma may be unilateral or bilateral. It may occur as a diffuse interstitial infiltration of lymphoid cells, there may be multiple nodular involvement, or a single large metastatic nodule (tumoral involvement) and lastly the kidney may be engulfed by lava-like flow of lymphomatous tissue more or less completely surrounding it (capsular form) with or without direct invasion of the parenchyma. Diagnosis offers difficulties because of the great variety of pathologic manifestations of lymphomas and their origin in deeply placed mediastinal mesenteric or retroperitoneal glands. Superficial adenopathy when detected usually implies a late stage of the disease. Although no cures of lymphomatous involvement of the kidney have been reported the outlook for lymphomas in general is not entirely hopeless, as attested by several observers. If lymphoma is confined to an accessible single mass, a finding dependent upon early diagnosis, there is an excellent chance for obtaining a cure by complete surgical extirpation of the primary focus. Irradiation and therapy with nitrogen mustards are considered valuable adjuvants to surgical treatment, in addition to their value in palliation. The term lymphosarcoma of the kidney should be replaced by the more correct designation of renal lymphomatosis. 29 references. 1 table. 7 figures.—*Author's abstract.*

Diagnosis of Lesions of the Upper Portion of the Urinary Tract. Fundamental Concepts. *Ira H. Lockwood, Arthur B. Smith and John W. Walker, Research Clinic, Kansas City, Mo.* J.A.M.A. 137:516-19, June 5, 1948.

Roentgen examination (plain roentgenogram of the abdomen, retrograde pyelogram and excretory urogram), as employed in the investigation of upper urinary tract lesions, is discussed in detail. In interpreting the anatomic, physiologic and pathologic findings from such an investigation, the lesions are divided into congenital anomalies, inflammatory involvement and neoplastic lesions. Excretory urography has greatly increased the knowledge of congenital abnormalities, the most common of which are: congenital malposition (ectopic kidney); duplications of pelvis and ureters; horseshoe kidney; congenital pelvic and ureteral dilatation; solitary pelvic kidney and congenital cystic renal disease. With inflammatory involvement the following roentgen signs are of distinct aid in the diagnosis of perinephritic abscess: obliteration of the kidney shadow; obliteration of the lateral border of the psoas muscle; convex curvature of the spine away from the abscess; displacement of the colon; renal fixation; displacement, limitation and fixation of the diaphragm; outward and anterior displacement of the kidney; and rotation of the calix in the upper pole of the pyelogram. The tubercle bacillus is the only organism capable of producing characteristic roentgen changes, the early changes being best demonstrated by retrograde pyelography. The characteristic areas of cortical necrosis, during pyelography, fill with the contrast medium and appear as small

irregular defects just beyond the calix. In renal carbuncle, a localized massive suppuration within the kidney caused by bacterial metastasis, retrograde studies may show distortion or destruction of a single calix. Hydronephrosis may be the result of mechanical obstruction or inflammatory changes following infection. Roentgenologically, the earliest change is loss of detail in the outline of the minor calices, a slight broadening of the major calices and some fullness of the true pelvis. The determination of the emptying time of the renal pelvis is more important than its size. Poor drainage may be proved by means of ten minute delayed roentgenogram following pyelography. The fact that dilatation of the upper urinary tract is an invariable accompaniment of pregnancy must not be forgotten. Benign or malignant intrarenal lesions are characterized by distortion or deformity of the renal pelvis or calices. Suspicion of renal angioma is justified when hematuria and a filling defect in the pyelogram occur in the patient under 40. Urography has made easier the recognition of cysts. Adenomas, often associated with cysts, are the most important sources of carcinoma in the substance of the kidney. Cortical hypernephroid carcinomas are the renal tumors most commonly found in adults. Although the pyelogram in renal carcinoma shows little tendency toward the displacement of the pelvis or calices, invasion is indicated by the irregularity and serrated edges of the pelvic outline. Sarcoma, as a malignant tumor arising from the supporting tissue of the kidney, is seldom seen as a primary lesion. 42 references.

Instrumental Visualization of the Renal Pelvis and Its Communications. Proposal of a New Method. Preliminary Report. Harry R. Trattner, St. Vincent Charity Hospital, Cleveland, O. J. Urol. 60:817-37, December 1948.

The addition of intravenous injection to retrograde urography has led to an increase in diagnostic accuracy and further development in upper urinary tract studies. Despite this advance, there remains a small but important percentage of cases in which all present methods fail either in diagnosis, therapy or both. To still further reduce this percentage of failure appeared a worthwhile general objective. Toward these ends a visual procedure is proposed for application, when conditions permit, to the renal pelvis and its communicating channels. This has been done with realization of limitations and dependence of the method on the condition of the patient, the anatomic and pathologic states of the renal, perirenal, ureteral, renal-pelvic structures, etc. Some of the specific objectives are as follows: Possible earlier diagnosis of tumor of renal pelvis and kidney than has heretofore been attainable, for the instrument's use may be indicated in instances of hematuria in the presence of a normal pyelogram or questionable pyelographic defect, particularly when nothing abnormal can be discovered on the surface of the kidney or its pelvis at the time of operative exposure. Diagnosis and possible removal of calculi in certain types of lithiasis. The possibility of isolation of renal segments of the one kidney by catheterization of their major drainage channels for differential urine examination,

dye-function tests or radiography of a renal segment thus isolated. Diagnosis and possible therapy of uncommon lesions indiscernible otherwise, such as valve or ledge of ureteropelvic junction, leukoplakia of renal pelvis, pyelitis cystica, granulosa, etc. To avoid or reduce instances of unguided nephrotomy by insertion of wire through a suspected infundibulum for penetration through the renal parenchyma of this area so that a localized and more exact nephrotomy can be performed. It is obvious that the above mentioned measures may be of extraordinary importance in certain lesions involving a solitary kidney in that conservation of renal substance is mandatory. It should be realized that the procedure is delicate, intended for use when other well-known methods are not applicable or fail. Before attempting its employment in the living patient, the operator should familiarize himself with the anatomy of the concerned structures, with what he can visualize and perform by practice in the excised kidney and the intact organ at autopsy. The operator must guard against: (a) Wound contamination; (b) dissemination of infection by back-flow phenomena, etc.; (c) prolonged renal anoxia; (d) tearing of pyelotomy incision into the crucial area of the ureteropelvic junction so as to avoid postoperative stricture. The contraindications are: (1) When conditions do not permit sufficient mobilization of the kidney with safety because of dense adhesions, short vascular pedicle, etc. (2) Inaccessibility of renal pelvis because of its type or pathologic involvement. (3) When the renal pelvis is too delicate or friable, (4) When pyelotomy and purse string suture cannot be performed within an adequate area sufficiently removed from the ureteropelvic junction. (5) In most of the acute inflammatory conditions, as well as in renal tuberculosis. The operative technic is discussed at length. 5 references. 19 figures.—*Author's abstract.*

## 10. Ureter

The Management of the Surgically Traumatized Ureter. *Thomas D. Moore, John Gaston Hospital, College of Medicine, University of Tennessee, Moore Clinic and Baptist Memorial Hospital, Memphis, Tenn.* J. Urol. 59: 712-25, April 1948.

A review of the literature dealing with accidental injury of the ureter during the course of pelvic operations revealed that it is not uncommon occurrence with an incidence of ligation as a complication of all operations on the female genital organs of 1 to 3 per cent. The proportion of unilateral to bilateral injury is approximately 6 to 1. The reported cases now aggregate more than 800 in number. The most common sequelae of ureteral injury are ureterovaginal and uretero-abdominal urinary fistulas. There is evidence that such accidents are preventable if the precaution is taken to insert catheters through both ureters in all cases where a difficult pelvic operation is contemplated. Instances of accidental injury of the ureter may be divided into two groups: (1) those in which the injury is recognized immediately; (2) those in which it is discovered during the postoperative period. Both groups may be further subdivided into those in which the in-

jury is: (a) unilateral; (b) bilateral. Types of injury are as follows: Ligation, occlusion from acute angulation from stitches placed near the ureter, crushing or clamping, incision without severance, severance, and resection of a portion of the ureter. The principles governing the management of surgical injury to the ureter are determined to a great extent by the early or late discovery and the nature and site of the injury. In instances of complete anuria following extensive pelvic surgery the possibility of bilateral occlusion of the ureters should be considered early rather than the adoption of therapy under the erroneous diagnosis of suppression of urine. In such cases although deligation as has been employed in the past has been attended by a very high mortality rate (approximately 90 per cent) it is believed that the active cooperation of a cystoscopist when the abdomen is re-opened would render the operation far more safe, as he would be able to insert ureteral catheters and inform the surgeon accurately of the location of the point or points of obstruction. Re-implantation of the ureter into the bladder may be considered preferable to uretero-ureteral anastomosis. The latter with its tendency to cicatricial stenosis at the site of anastomosis often sentences the patient to the necessity of numerous subsequent cystoscopic treatments and ureteral dilatations. When a ureter has been severed or damaged destructive surgery, involving sacrifice of the kidney by ligation of the ureter or by nephrectomy, is to be condemned except under most urgent circumstances. Transuretero-ureteral anastomosis may be considered among conservative measures, including cutaneous ureterostomy and uretero-intestinal anastomosis, as a measure to be adopted when the ureter has been extensively damaged or severed at too high a level to permit its re-implantation into the bladder. Of these procedures transuretero-ureteral anastomosis would appear the most desirable.

Four cases are cited from the author's experience. In 1 deligation of both ureters was performed on the sixth postoperative day. In another case both ureters had been severed and ligated, one of which reopened causing a ureterovaginal fistula; both ureters were re-implanted into the bladder with a good functional result and although the right ureter had been completely occluded for three months the kidney displayed remarkable recuperative ability upon release of the obstruction. In the third case the right ureter had been transfixed and partially occluded, conducive to a hydronephrosis of 75 cc. capacity. The opposite ureter had been ligated, followed by a hydronephrosis of 170 cc. capacity when discovered two months later. The right ureter responded favorably to ureteral dilatation. The left ureter was re-implanted into the bladder and the fairly rapid return to approximately normal capacity and function was literally amazing. In the fourth case the left ureter, when it had been severed and ligated, was re-implanted into the bladder. The right ureter also had been severed and ligated but at too high a level to permit vesical re-implantation. It was therefore anastomosed to the re-implanted left ureter as a transuretero-ureteral anastomosis with an excellent functional result. These 4 cases are illustrative of the various measures adopted in the conservative treatment of the surgically injured ureter. In all both ureters were involved. In none was a kidney

sacrificed. Late follow-up findings are included, indicative of satisfactory functional results in all. There was no mortality. 14 references, 4 figures.—*Author's abstract.*

**Reimplantation of Skin Ureterostomies into the Bowel.** *Simon A. Beisler, New York, N. Y. J. Urol. 60:76-82, July 1948.*

Two cases of successful reimplantation of skin ureterostomies into the bowel are reported. The first patient, a 50 year old man, was treated for grade 3 transitional cell carcinoma of the urinary bladder by total cystectomy, prostatectomy, seminal vesiculectomy and bilateral skin ureterostomy. Because of his dissatisfaction with the last, the ureters were reimplanted into the sigmoid with a successful result. Roentgen ray follow-up showed the ureteral dilatation to be lessening. The second patient was a 31 year old woman with urinary incontinence resulting from meningococcus meningitis. A plastic operation for the restoration of urinary control (performed in Palestine eight years before) had been unsuccessful and resulted in a vesicovaginal fistula and loss of the entire urethra (perhaps through trophic tissue changes). Attempted restoration of the urethra, one year ago, also had been unsuccessful. On admission satisfactory anal sphincter control was demonstrable. Intravenous urograms disclosed pronounced bilateral hydronephrosis, tortuosity and bilateral ureteral dilatation in addition to a small bladder shadow. Following total cystectomy and bilateral skin ureterostomy the patient was obliged to return to the hospital three times because of indifferent drainage, intermittent pain and a low grade fever. During the fourth admission, she refused to leave until reimplantation into the bowel was carried out, and after three months of constant hospital preparation, this was done (Coffey I). Although the postoperative course was somewhat stormy and required sulfonamides, antibiotics and transfusion, recent urograms show less hydronephrosis. Rectal sphincter control has been excellent and the sphincter functions every three to four hours during the day and every four to five hours during the night. The technic employed was not original and consisted of breaking down skin ureterostomies largely by sharp dissection; preparing the bed into the sigmoid (just below the pelvic brim) by incision down to the mucosa followed by a small incised opening through the mucosa at the distal end; and carrying the ureter into the lumen and anchoring it to the bowel wall by means of an intestinal chromic catgut suture through the anterior lip of the previously split distal end of the ureter. Closure of the bed was made with a continuous chromic catgut suture and an overlapping layer of interrupted similar sutures. Amputation of 2.5 to 7 cm. of distal ureter could have been avoided by selecting a lower site for implantation but possible circulatory embarrassment of the distal portion of the ureters was feared despite the absence of gross evidence of this complication. Proper preliminary preparation of the bowel with such agents as sulfathalidine or sulfasuccinamide is of the utmost importance. 3 figures.

Reimplantation of the Ureter into the Bladder. *J. G. Warden and C. C. Higgins, Cleveland Clinic, Cleveland, O.* Cleveland Clin. Quart. 16: 38-46, January 1949.

With the introduction of intravenous urography, it has been possible to determine the indications for reimplantation of the ureters into the bladder and an increasing number of cases are being found suitable for this operation. The chief indications for reimplantation of the ureter are traumatic injury of the lower ureter (including operative injury); embryologic malformation of the lower ureter; neoplastic involvement of the lower ureter, including benign ureteral tumors and bladder tumors in close proximity to the ureteral orifice; inflammatory involvement of the lower ureter, associated with ureteral stones or pelvic inflammatory disease; and other factors (such as a bladder diverticulum) involving the lower ureter. Before the operation of ureteral implantation is done, a complete history and physical examination are necessary in addition to the examination of the urinary tract. Such conditions as disseminated carcinomatosis, advanced arteriosclerosis or low cardiac reserve render the operation dangerous. In the urinary tract examination cystoscopic examination is important to detect the best site for reimplantation. A retrograde pyelography should be attempted, and at this time specimens of urine may be collected for bacteriologic examination, so that specific chemotherapy can be employed before and after operation if necessary. The intravenous urogram is most important, as it shows the extent of renal and ureteral damage, which may be so advanced as to contraindicate operation. It also shows the location of the ureteral stricture, any ureteral anomalies and the distance of the normal portion of the ureter from the bladder. Injection of methylene blue into the bladder and intravenous injection of indigo carmine are also of value, as these procedures indicate whether a urinary fistula originates from the ureter or from the bladder. In the operation for implantation of the ureter into the bladder, it is important in freeing the ureter from the surrounding tissue to preserve its blood supply. The implantation is made as near the original ureteral orifice as possible; a trough incision is made in the bladder wall down to the mucosa; the muscle layer is peeled from the mucosa for about 1 cm. for further preparation of the trough. A stab incision is made through the mucosa and the ureter, in which a ureteral catheter has previously been placed, is drawn through, for a distance of 1 inch into the bladder. Chronic catgut sutures are used to anchor the ureteral stump to the mucosa, submucosa and muscular layer of the bladder, with a few additional sutures through the ureteral adventitia and bladder mucosa. Tension on the sutures by a taut ureter is avoided. The ureteral catheter is brought out through a minute stab wound in the lateral bladder wall and out through the incision. A Penrose drain to the perivesical space is used. An indwelling catheter passed through the urethra into the bladder is kept in place for two weeks to give complete relaxation to the bladder which favors healing of the anastomosis. Four illustrative cases are reported. 7 figures.

Use of Polythene and Polyvinyl Tubing in Ureterostomy, Nephrostomy and Cystostomy. *Deward O. Ferris and John H. Grindlay, Mayo Clinic, Rochester, Minn.* Proc. Staff Meet., Mayo Clin. 23:385-90, Aug. 18, 1948.

The use of tubes of a new material was prompted by the tendency of rubber tubes, such as are used after nephrostomy, ureterostomy and cystostomy, to lime and thus to impede the flow of urine. Polythene and polyvinyl tubes are flexible and inert in living tissues. Previous experimental work had indicated that their surfaces were nonwettable. It seemed, therefore, that they would not become encrusted with urinary salts. The first case was one in which rubber nephrostomy tubes had repeatedly become occluded by lime salts. A polyvinyl tube was substituted. It remained in place for thirty-three weeks without any sign of liming. Similar success was attained in a case in which rubber cystostomy tubes had rapidly become occluded by lime salts. Heretofore it has been possible to continue drainage as long as desired after ureterostomy has been carried out because of liming of the tube. In 7 cases a polythene ureterostomy tube and a rubber nephrostomy tube were used. The ureterostomy tubes were maintained in place for periods of from twenty-four to fifty-three days. Whereas there was no liming of the polythene tubes, all of the rubber tubes showed some degree of liming deposits. The consistency of the results indicates that little, if any, liming occurs in ureterostomy, nephrostomy and cystostomy tubes of polythene or polyvinyl. 4 figures.—*Author's abstract.*

Report of Two Cases of Carcinoma of the Ureter. Discussion on the Pathogenesis of Urinary Tract Tumors. *Thomas Gualtieri, James J. Hayes and Abraham D. Segal, Brooklyn, N. Y.* J. Urol. 59:1083-1100, June 1948.

These 2 cases of ureteral carcinoma bring the total reported cases to 196. The first patient, a 66 year old white man, was admitted to Coney Island Hospital complaining of left lower abdominal pain of five weeks' duration and a weight loss of 15 pounds. Past history indicated a suprapubic prostatectomy, one year before, after an attack of acute urinary retention. A large mass in the loin extended anteriorly and almost filled the left abdomen, and was visible in a plain roentgenogram. At cystoscopy various sized catheters failed to pass beyond 15 cm. on the left side but a cast of mucopurulent material and sanguineous debris was dislodged. Dye injected into a ureteral catheter at this level permitted disclosure of a collection of opaque solution in what appeared to be a large irregular cavity in the kidney region. The widened ureter was incompletely filled and numerous small filling defects were noted in the dilated distal portion. The diagnosis was (a) perinephric abscess; (b) left pyonephrosis secondary to ureteral carcinoma. An incision in the left costovertebral region permitted the evacuation of 2 liters of thick, purulent, foul smelling material. After his general condition improved, plans were made for a nephrectomy and ureterectomy in two stages. The ureter, excised as low as possible, was thickened to five times its normal size and nodular throughout its whole length. The remaining

ureteral portion was encased in a Penrose drain the end of which protruded from the wound. The enlarged kidney with nodular areas firmly adherent to the peritoneum was excised in the usual way. Four weeks later the remainder of the ureter was removed. Penrose drains inserted behind the bladder and in the space of Retzius were removed on the tenth day and the suprapubic tube (de Pezzer catheter through a stab wound in the bladder dome) on the twelfth day. Voiding was then spontaneous. The pathologic diagnosis was ureteral papillary carcinoma, pyonephrosis and xanthomatosis of the kidney with foreign body reaction. Two years later cystoscopy showed no neoplastic recurrence within the bladder but a small indurated mass was palpable at the lower end of suprapubic scar. Roentgenotherapy was refused and the patient never returned.

In the second case (58 year old white man) the acute urinary retention was of eight hours' duration. Frequency, urgency and nocturia had been noted for two weeks. Physical findings were unremarkable except for a distended bladder and prostatic hypertrophy (grade 2 per rectum). Excretory urography showed the left kidney to be nonfunctioning. Cystoscopy permitted evacuation of a large collection of blood clots. After some difficulty with obstruction at 2 cm. and considerable brisk bleeding, a left ureteral catheter was passed 28 cm. to the renal pelvis. The return from the renal pelvis was clear. An irregular filling defect in the lower ureter with an associated ureterohydronephrosis above was evident in the pyeloureterogram and the diagnosis was malignant obstruction of left lower ureter. At operation (one-stage nephroureterectomy and partial cystectomy) the mass, measuring  $1\frac{1}{2}$  by  $3\frac{1}{4}$  inches, was palpated in the ureteral lumen above the bladder insertion. No glands were palpable. Convalescence was satisfactory. The pathologic diagnosis was ureteral papillary carcinoma; chronic pyelonephritis; and hydronephrosis. Cystoscopy showed a normal bladder in the sixth postoperative month and roentgen ray and blood studies were normal in the ninth month. The patient died of coronary thrombosis one year after operation. Autopsy was refused.

Histologically and clinically ureteral epithelial tumors are akin to those arising from the mucosa of the bladder and kidney pelvis. The features which characterize them are: pronounced tendency toward recurrence and a propensity to multiplicity. However, these two features are manifestations of one property, consecutive or simultaneous multiplicity and this concept of multicentricity of origin is felt to provide the only satisfactory explanation for the distinctive behavior of such tumors. The literature on the pathogenesis is discussed, as is the problem of classifying malignant and benign tumors of the urinary tract epithelium. Prophylaxis and future treatment, based on a reversal of the pathogenetic process through neutralizing or inactivating agents or modalities, are considered. 47 references, 7 figures.

## 11. Bladder and Urachus

The Bladder in Prostatism. An Operation for Excessive Bladder Hypertrophy. *E. G. Crabtree and S. Richard Muellner, Beth Israel Hospital, Boston, Mass.* J. Urol. 60:593-98, October 1948.

There are rare instances of benign prostatic obstruction when prostatectomy will not restore normal micturition. Postoperatively these patients either cannot void at all or else they pass small quantities of urine and retain a large residual. The poor result is not due to inadequate removal of the obstructing tissue, nor is it due to neurogenic vesical dysfunction. These patients cannot void because of changes in the structure of the bladder wall itself, which result in considerable loss of its expulsive power, and thus convert the viscous into the inelastic sac. In these patients the bladder is found to be quite large, and may contain up to 2 or 3 liters of urine. Its wall may attain a thickness of 2.5 cm. or more. When the bladder is emptied through the cystoscope it does not contract in a normal fashion but collapses into thick folds. Histologically the bladder wall shows a marked dispersal of the smooth muscle fibers. The smooth muscle tissue, moreover, is separated by thick fibrous septa so that in many areas one sees small islands of muscle surrounded by dense scar. Grossly, the bladder wall has a leathery consistency and its cut surface is gritty and is streaked with yellowish or whitish fibers. The reason for these changes is not clear, although most patients have had an overdistended bladder for a long time, and this overstretching may account for the loss of elasticity. Age, arteriosclerosis and infection do not seem to be causative factors. To restore micturition in such patients, the authors recommend that the bladder be exposed suprapubically, freed superiorly and laterally, and that about two-thirds of its mobile portion be excised. The small remaining bladder is then reconstructed about a cystostomy tube. After the suprapubic fistula has healed, the bladder regenerates to within normal limits, and functions surprisingly well. Eight case reports of such excessive bladder hypertrophy and scarring are reported. 3 figures.

—Author's abstract.

Role of the External Urethral Sphincter in the Normal Bladder and Cord Bladder. *John L. Emmett, Mayo Clinic, Richard V. Daut and J. Hartwell Dunn, Mayo Foundation, Rochester, Minn.* J. Urol. 59:439-54, March 1948.

The treatment of cord bladder has undergone considerable advances in recent years. With suitable care, urosepsis can be abolished and satisfactory vesical function established. In a certain number of cases of neurogenic vesical dysfunction, resection of the vesical neck will be necessary. Most true cord bladders eventually become hypertonic and trabeculated and the vesical neck (internal sphincter) becomes involved. The spasticity of the vesical neck acts as an obstruction and is responsible for residual urine and vesical disability. The authors' experience with resection of the vesical neck in cases of cord bladder has been most encouraging. The best results are obtained in those cases in which residual urine is present in the bladder. In general,

the best results are also obtained in the autonomous (nonautomatic) bladder, rather than in the automatic (reflex) bladder. Head and Riddock, in writing on injuries of World War I, recognized that the most common type of cord bladder is the hypertonic bladder which is unable to evacuate its contents completely because of an excessively tonic sphincteric mechanism which is apparently unable to relax. This the authors considered to be the great underlying principle in the problem of cord bladder; it is the reason why transurethral resection of the vesical neck is successful in a large proportion of cases. Recent experience has demonstrated that not only is the vesical neck (internal sphincter) a factor, but, in some cases, abnormal degrees of spasticity or flaccidity of the external urethral sphincter or inability of the external sphincter muscle to relax may be factors of importance which must be corrected to achieve satisfactory vesical function in the neurogenic bladder.

The majority of patients with cord bladders are successfully treated with proper care and by subsequent transurethral resection when necessary. However, there are certain problems which are not completely solved by the foregoing treatment. They are: (1) cord bladder containing little or no residual urine (myelodysplasia such as in spina bifida occulta), in which active incontinence occurs continuously; (2) the small group of cord bladders which are unable to empty despite repeated transurethral resections of the vesical neck; (3) irritable automatic bladder which empties correctly after transurethral resection but in which the intervals between evacuation are too short and irregular. Regarding problem 1, the authors reported cases to illustrate the limited applicability of muscle-imbricating operations upon the urethra in the female (such as the Kelly and Kennedy operations) to improve the tone of the external sphincter. This is usually done in combination with the transurethral resection of the vesical neck. Regarding problem 2, the authors reported a case in detail in order to illustrate the role of a spastic external sphincter when repeated transurethral resection would not allow a patient with a cord bladder to void. Numerous cysto-urethrograms showed marked spasticity of the external sphincter. The spasticity was relaxed by bilateral pudendal block, by sacral block and finally by section of the anterior and posterior roots of the fourth and fifth lumbar and five sacral nerves. The relaxation was accompanied by ability to void for the first time since the patient's accident.

In order to obtain more information about the function of the external urethral sphincter, a cysto-urethrogram study was made of 5 persons who did not have any neurologic lesion and of 10 patients who had lesions of the spinal cord and associated vesical dysfunction. In cases in which the persons did not have any neurologic lesions, a preliminary cysto-urethrogram was made, then either transsacral block, spinal anesthesia or pudendal nerve block was used. The bladder was then filled with fluid and the subjects were urged to void. With pudendal block, voiding was possible with no loss of continence. With transsacral block or spinal anesthesia, inability to void was noted but the bladders were continent. Cysto-urethrograms made during the period of anesthesia showed no change in the appearance of the external sphincter from that observed prior to anesthesia. In 7 of the 10 cases in which

the patients had lesions of the spinal cord, cysto-urethrograms revealed evidence of increased tonicity of the external sphincter. In 4 of the 7 cases, one of the previously described types of anesthesia was used. In all 4 cases, cysto-urethrograms made during the period of anesthesia showed relative relaxation of the spastic external sphincter. Transurethral resection of the vesical neck was undertaken in the 7 cases. Excellent results were obtained in 5 cases. In the other 2 cases, the patients were unable to void despite repeated transurethral resection but were able to void well while under any one of the three types of anesthesia. The remaining 3 of the original 10 patients (showing no evidence of spasticity of the external sphincter) were examined in detail. Two of the 3 had had the lesion only a short time (six to eight months) and there was no evidence of reflex spasm. In 1 case, the cystourethrogram showed marked relaxation of the external sphincter. In this case, the patient, as might be expected, lost small amounts of urine with sudden movements or straining. The authors expressed the opinion that the study has plotted some new avenues of therapeutics which warrant further exploration. 18 references. 7 figures.—*Author's abstract.*

The Care of Paraplegic Patients in General Hospitals. *Eric Rogers, Ottawa, Ont., Canada.* Canad. M. A. J. 59:338-43, October 1948.

Teamwork is the fundamental requirement in the care of a paraplegic patient, and this must be understood by the patient, his physicians, nurses and by the hospital personnel who are concerned with his care. The general hospital team's objective must be the preparation of that patient for transfer to a paraplegic center at an early date and without such complications as decubitus ulcers, contractures or urinary sepsis. If a suspected paraplegic has not voided after eight hours following his admission and the bladder is distended, a Foley catheter (should never exceed 18F) must be introduced into the bladder aseptically. The automatic bladder irrigation is the most important single advance in the care of this type of patient. The functional capacity of the bladder should be estimated by cystometry (Munro routine) as soon as possible. Unless spinal shock is present, the absence of the reflex anal contraction, determined by pricking either the perineal region or the glans penis, indicates paresis of the external urethral sphincter. Cystometry, including measurement of residual urine, must be done no less than every three weeks not only as means of following each step toward optimum functional activity but as a means of relieving stasis before it can lead to calculus formation. A plain urogram should be made every three months and an intravenous pyelogram every six months; if the patient complains of a generalized, oppressive, dull abdominal discomfort which increases on palpation or percussion of the costovertebral angles, and if a temperature elevation of 99 to 100 F. is noted, these procedures must be done at once. Decubitus ulcers may be avoided by a strict turning schedule, good care of the back and the relief of pressure points. Once an ulcer develops, it should be treated with dry heat and, under certain conditions, by excision of the edges followed by a split thickness skin graft or a rotation flap. Dietary adequacy is best determined by keeping an accurate weight chart. The diet must be aimed at pre-

venting or correcting proteinemia and for this purpose concentrated food sources of protein should be used. In the paraplegic patient frequent loose stools are most often caused by fecal impaction. Bland enemas should be given routinely every second day, unless such laxatives as gelucil, agarol, liquid paraffin, petrolagar or milk of magnesia are effective. The purpose of physiotherapy is the prevention of contractures and muscular deterioration, especially of the arm and upper trunk musculature. When possible, simple reconditioning exercises should be started and the program expanded as indicated. With respect to the psychologic aspect, each case should be considered individually. Unless there are major physical defects which cannot be overcome, treatment has failed if the patient is unable to be discharged to take up a useful, active part in community life, and during convalescence there should be a definite objective for which the patient can plan. Otherwise physical and mental deterioration will eventually occur. The interest of various civic organizations should be sought. 22 references.

**Transurethral Resection for Neurological Bladder.** *John E. Dees, Duke University School of Medicine, Duke Hospital, Durham, N. C.* J. Urol. 60: 907-14, December 1948.

The results of transurethral prostatic resection in 15 cases of neurologic bladder are analyzed. In all instances the indication for operation was the presence of infected residual urine which, in 11 of the 15 cases, was in excess of 500 cc. Bladder neck obstruction was minimal or absent in all cases, 6 Gm. of tissue or less being removed in 12 cases. The results were good in the cases of tabetic bladders and in those secondary to multiple sclerosis and injuries of the lumbar and sacral cords. Poor results were obtained in the cases of lesions of the cervical cord and cerebrum and in the diabetic pseudotabetic bladder. A detailed case report on 1 patient with severe multiple sclerosis is presented. Urinary frequency in excess of twenty times daily, severe urgency and incontinence necessitated the wearing of an incontinence bag. Residual urine was 225 cc. and cystometric study showed a completely uninhibited neurologic bladder. No obstruction was present in the posterior urethra. Following resection of the bladder neck and prostatic urethra, individual voidings varied from 300 to 500 cc., urinary incontinence disappeared and urination could be inhibited for thirty minutes after appearance of the desire to void. Residual urine decreased to 150 cc. or less and bladder function was excellent eight months postoperatively. 2 references, 1 table.—*Author's abstract.*

**Stress Incontinence in the Female.** *P. A. Treahy and H. K. Pacev, Wellington, New Zealand.* Australian & New Zealand J. Surg. 17:247-52, April 1948.

Consideration of the anatomy of the pelvic floor and examination of patients with stress incontinence shows this condition to really be a herniation of the bladder base and urethra through the pelvic floor. Any suddenly increased intra-abdominal pressure is therefore concentrated in the hernia, as in an inguinal hernia, and not dissipated over the pelvic floor. There is

no lesion of the bladder, bladder neck or sphincter. In diagnosing these cases, bladder disease is eliminated by cystoscopic examination and the external meatus is inspected to see that there is no leakage or true incontinence. Urine spurts from the meatus when the patient coughs but none escapes if two fingers are placed in the vagina on either side of the urethra so that the base of the bladder is supported during coughs. Study of the anatomy of the pelvic floor shows that the pubococcygeus muscle should be used to close the defect instead of the pubocervical fascia as is done in the standard operation. This muscle is readily accessible and should be united in the midline below the urethra and bladder base from as near the external urinary meatus as possible to a spot in front of the cervix. An operation to accomplish this is described. The anterior vaginal wall is opened by an incision extending up to the external urinary meatus. Flaps of vaginal mucosa and pubocervical fascia are turned outwards and the bladder freely mobilized so that it may be easily displaced into the pelvis. The cleavage plane between bladder and fascia is extended forward and the urethra dissected forwards to the external meatus, being freed on each side from the fascia and any adhesions so that the examining finger impinges on the os pubis anteriorly and the ischio-pubic ramus laterally. Pulling the mucosal and fascial flaps outward and retracting the urethra inward enables complete inspection of the paraurethral fossa. The edge of the pubococcygeus muscle and fascia is seen as a pearly white band running anteroposteriorly deep into the fossa. This is sutured to the opposite corresponding muscle edge by interrupted light chromic catgut sutures which close the hernial gap posteriorly and tend to compress the urethra anteriorly. The pubocervical fascia and vaginal wall are sutured and any prolapse repaired as indicated. Continuous bladder drainage is maintained for about ten days. Longer catheterization is sometimes necessary until the patient voids naturally. A series of 13 illustrative histories is presented of cases on whom this operation was done with 100 per cent satisfactory results. 1 figure.

Stress Incontinence. *Mortimer Reddington, London, England.* Brit. J. Urol. 20:77-81, June 1948.

Describes an operation for stress incontinence in which the tissue between the urethra and the pubic ramus is brought under the neck of the bladder and the urethra, so that these structures are displaced upward under the pubic arch and held in this position. In this operation, the whole length of the urethra, including the neck of the bladder must be placed in the new position, at least  $\frac{1}{2}$  inch under the pubic arch. Enough firm tissue must be brought under the urethra and the bladder neck to hold them permanently in this position. In order to fulfill these conditions the operator must have free access to all the tissues involved. No. 3 catgut is used for the holding sutures. A self-retaining catheter is not used after operation but most patients have to be catheterized for the first forty-eight hours. In over one hundred and twenty operations by this method, there were 2 cases in which the operation failed to cure the urinary incontinence; these patients have since been cured by a second operation of the same type, which was, however,

more difficult than the first operation on account of the scar tissue present. In 2 other cases, relief of the incontinence was not complete; there is still some leakage of urine on great strain but these 2 patients are able to lead normal lives and consider that the slight disability can be disregarded. 7 figures.

**Urinary Stress Incontinence in Women. A. R. H. Duggan, Sydney, Australia. M. J. Australia 2:286-91, Sept. 11, 1948.**

Discusses the various operations employed in the treatment of stress incontinence of urine in women, and reports 22 cases of this type treated by the method described by Kennedy in 1937 or a modification of it. In the first five or six operations, Kennedy's technic was followed exactly except that twenty-day chromic catgut was used instead of silver wire for all sutures. In the later cases in this series, Kennedy's technic of separating the attachment of the posturethral ligament to the pubic rami was not employed but the vaginal flaps were separated well out to the attachment of the lateral borders of the posturethral ligaments to the top of the pubic rami. Some troublesome bleeding occasionally occurred in this area but it was usually controlled as the tissues were approximated. The author also does not employ an indwelling catheter after operation but insists on patients being catheterized regularly every six hours (or more frequently if there is any distress) until spontaneous urination is established that empties the bladder completely. Several of the patients operated on had had one or more previous operation for stress incontinence without success. Following operation by the Kennedy method, or the author's modification of it, all but 2 of the 22 patients were not completely relieved immediately after operation but cure was established within four months. The 2 cases in which the operation failed are reported in detail. In 1 of these cases failure was due to a urethrocele; this shows the importance of giving adequate support to the urethra right to the external meatus. In the second case, the stress incontinence was relieved to some degree but not cured; this patient was a nulliparous woman whose vagina was narrow, with no relaxation of the anterior vaginal wall. She was operated on early in the series, and, from his later experience, the author is of the opinion that the Kennedy operation should not have been done in this case. 24 references. 6 figures.

**Vaginal Operations for Cystocele, Prolapse of the Uterus, and Stress Incontinence. Wilfred Shaw, St. Bartholomew's Hospital, London, England. Surg., Gynec. & Obst. 88:11-22, January 1949.**

Describes the grooves, rugosities and folds of the anterior vaginal wall and the anatomic relationships of the endopelvic fascia in the vicinity of the anterior vaginal wall. The endopelvic fascia form a condensed layer behind the urethra, as has been generally recognized by gynecologists; this layer of fascia is sometimes designated as paraurethral fascia. But because of its condensed consistency, its lateral attachments and well-defined upper border, the author is of the opinion that it should be considered a separate fascial structure, for which he suggests the designation of posturethral liga-

ment. In the operation of vaginal hysterectomy for uterine prolapse and in the Manchester-Fothergill operation, the author employs the posturethral ligament; his technic in these operations is described. In an operation for cystocele, the bladder must be mobilized and returned to its normal position; and the hiatus between the upper border of the posturethral ligament and the cervix closed so that the bladder will not prolapse again. In the author's opinion this cannot be done satisfactorily by use of the vaginal wall alone or of the vaginal endopelvic fascia. In his operation for cystocele, the bladder is mobilized and pushed upward and the space is closed by suturing the posturethral ligament directly to the cervix. The posturethral ligament is the strongest supporting tissue in this area, and the end results of this operation have been very satisfactory. Following operation an indwelling catheter is employed for at least five days, as most patients have difficulty in voiding urine for nearly a week. In the treatment of stress incontinence, a strip of fascia lata is passed between the anterior vaginal wall and the ureter; the two ends of this strip are supported either by passing them through drill holes in the pubic bone and suturing them together in front of the pubic bone; or bringing them out through the lower angles of the obturator foramina. While no complications occurred in the author's cases in which the pubic bones were drilled, and the sling support is not quite so effective in direction when the ends are brought out through the obturator foramina, this latter method has given good results in the few cases in which it has been tried and at present the method of drilling the pubic bones is employed only in severe cases. In 25 cases in which fascia lata has been employed in the operation for stress incontinence the end results have been satisfactory and superior to those obtained with the Aldridge operation, owing to the broad support of the fascia lata sling. 6 references. 24 figures.

The Bladder in Genital Prolapse. *Armando Trabucco, Alvear Hospital, Buenos Aires, Argentina.* J.A.M.A. 137:1578-81, Aug. 28, 1948.

In cystoscopic examination, vesical changes in prolapse of the first degree may be slight but they are always present. The vesical wall becomes slightly trabeculated through hypertrophy of the plexiform layer. The air bubble tends to be displaced toward the anterior wall. The interureteric ligament and the vesical fundus appear more pronounced. In the vesical neck, the posterior lip becomes hypokinetic. In second degree prolapse these changes become more pronounced and there are marked changes in third degree prolapse. The trabeculated bladder is the rule. Roentgenographic comparison is necessary. In first degree prolapse the vesical globe is seen displaced backward and has an ovoid shape. The urethra penetrates into the anterior part of the lower border of the bladder. The anterior fundus has become smaller while the posterior fundus is excavated. The anterior lip of the vesical neck becomes an acute angle; the posterior lip becomes an obtuse angle and appears flat and below the anterior lip. The conditions are accentuated in second degree prolapse. In third degree prolapse there is seen an almost complete falling downward and backward of the bladder. The bladder shape is stomach-like. The anterior fundus has almost disappeared and the

posterior fundus is far below the horizontal line through the vesical neck. The urethra slants downward and backward. The angle of the anterior lip of the neck is acute and that of the posterior lip rather obtuse. The urologic symptoms are: (1) dysuria, pollakiuria and incontinence during muscular effort; (2) incontinence with total voiding of the bladder; (3) incontinence with retention of urine. The symptoms occur in all degrees of prolapse. In first degree prolapse the uterus drags the bladder and there is pulling of the nerve plexuses controlling the vesical neck. This causes frequent urination and dysuria. The posterior lip is then displaced backward, producing mechanical failure. In second degree prolapse the posterior lip will be dragged and become separated from the anterior lip. This causes lack of mechanical urinary control, with uncontrollable incontinence. In the third degree prolapse there is a great change in the relations between the urethra and the bladder. Ineffective drainage occurs and the patient suffers from incontinence with urine retention. 3 references, 4 figures.

**Cystitis Glandularis. A Consideration of Symptoms, Diagnosis and Clinical Course of the Disease.** *Hans R. Sauer and Michael S. Blick, Roswell Park Memorial Institute, Buffalo, N. Y.* J. Urol. 60:446-58, September 1948.

As a rule, symptoms of cystitis glandularis are not characteristic. Dysuria, always in combination with frequency, is the most common complaint; intermittent hematuria, with or without pain, rates second. In 1 case, the persistent elimination of a clear and tenacious mucus was the only symptom. It appears likely that frequency, dysuria and hematuria are caused by superimposed infection rather than by the disease itself, while the elimination of mucus indicates the presence of mucus-producing glands. It is advisable to carry out mucin tests whenever this disease is suspected. The vesical neck region, trigone, as well as lower posterior and lateral walls, are the site of predilection, although other parts of the bladder may occasionally be affected. Isolated case reports indicate certain types of epithelial cell nests have been found in the kidney pelvis and ureter but in this series no evidence of upper urinary tract changes was determined. Cystoscopic examination represents the most valuable procedure in the diagnosis. Bladder capacity is not significantly reduced nor is the examination unduly painful. The cystoscopic picture appears to be characterized by two distinctive types of lesions. The first type consists of mammillated bleb-like structures which are separated by deep ridges. The areas involved are homogenous in character and no individual blood vessels can be distinguished. The lesion differs from bullous edema in that the elevations are fleshy in appearance and lack transparency. The second type is characterized by the formation of fleshy villous-like proliferations. This lesion consists of islands which may be confluent or separated from each other by normal or almost normal mucosa. Individual blood vessels are commonly observed. In both forms the transition from diseased to normal tissue is usually quite abrupt.

Final confirmation of the diagnosis rests with the histologic findings. Here again, two types of lesions are noted. The first and more common

type is characterized by glands of stratified squamous epithelium, the lumen of which are lined by columnar epithelium with occasional mucus-producing cells. In the second form, the presence of numerous goblet cells represents the outstanding feature. Here, the picture may resemble intestinal mucosa to a remarkable degree. By employing the muci-carmine stain the presence of mucus-producing cells can be demonstrated in doubtful cases. The pathogenesis of cystitis glandularis has been subject to discussion ever since the disease was first described. Its origin has been attributed by various authors either to metaplasia from chronic irritation or dysontogenesis. In this series, a history of long standing or frequently recurring infection was elicited in only 2 of 7 cases. Treatment should be conservative. Active bleeding may be arrested by transurethral coagulation. The source of any infection, if determined, should be eliminated. In the other cases, the infection should be treated with urinary antiseptics. Destruction of the proliferative changes by means of coagulation may yield permanent results in small lesions but where they are more extensive it appears doubtful whether a satisfactory result can be obtained by this method. In patients who are asymptomatic, with negative urine, watchful waiting seems to be the wisest course to follow. 11 references. 7 figures.—*M. S. Blick.*

The Relation of Transitional Cell Buds, Golgi Apparatus and Mitochondria to Carcinoma of the Bladder. *Albert E. Bothe and David S. Cristol, Jeanes Hospital, Philadelphia, Pa.* Am. J. Roentgenol. 60:535-41, October 1948.

Vesical tumors vary widely in appearance but it is agreed that they originate from the transitional cell. The biologic behavior of bladder tumors was studied in the hopes of improving the end results of treatment. The distribution and arrangement of the transitional cells were first studied and then a cytologic study made of the Golgi apparatus and mitochondria found in malignant and nonmalignant cells. Cell nests identified as transitional cell buds found in the ureter of 38 of 54 consecutive autopsy specimens were generally agreed to be quite suggestive of susceptibility to active growth. Review of these cell nests may be closely associated with vesical tumors, the multiplicity of epithelial buds in the kidney pelvis, ureters and bladder being most suggestive of subsequent tumor development from the cell nests. This indicates the stimulating substance causing tumor growth is still active and that activation of these cell nests should be dependent upon changed susceptibility to activation. Though this hypothesis has not been proved, it was felt that these immature cell nests might be inactivated or made unsusceptible to growth by roentgen therapy. Treatment of 3 cases of low grade multiple vesical papillomas by roentgenotherapy caused no apparent change in gross tumor appearance but they did not recur after subsequent fulguration. New tumors occurred in other bladder areas however in 2 cases treated only by transurethral fulguration. Studies were then made of the Golgi apparatus and mitochondria. The former has been variously described as a series of canals, vacuoles or lipid threads usually located between the nucleus and free surface of epithelial cells. The mitochondria are a lipo-

protein complex subject to marked variation in number and form. Study of specimens from fifteen vesical tumors and of uninvolved control tissue showed changes of the Golgi apparatus and in the number, shape and size of the mitochondria. These changes in the Golgi apparatus may be reversal with relation to the nucleus. While no definite conclusions have been made, these changes may be valuable in indicating a relation between cytogenic changes and prognosis of bladder tumors. It has been found clinically that a patient with a neoplasm of the renal pelvis, ureter or bladder may have or may develop a tumor in any other of these locations. The association between these cell buds and transitional cell type tumors suggests a modification of the present treatment by possible arrest or prevention of cell bud activity. The authors therefore now follow operation by roentgenotherapy over the remaining areas covered by transitional cell epithelium, consisting of all the remaining urinary tract. While too few patients have been studied and insufficient time has passed to properly evaluate results, follow-up of these patients having cancer of the renal pelvis, ureter and bladder has been encouraging. 4 figures.

The Treatment of Bladder Tumors. *Archie L. Dean, Memorial Hospital, New York, N. Y.* J. Urol. 60:92-97, July 1948.

Because there are a number of therapeutic measures which have proved useful in the treatment of bladder tumors and because there is uncertainty regarding the conditions for which they are best suited, the writer believes it appropriate to show the clinical conditions which, in his experience, have been most amenable to the treatments described: I. *Transurethral electrocoagulation*: (a) Single papillomas no longer than 1.0 cm. base diameter; (b) Multiple papillomas of the same size and no more than 15 in number. Frequent cystoscopic observation. II. *Transurethral implantation of radon seeds with or without electrocoagulation*: (a) Single papillomas or single papillary carcinomas: (1) Favorably situated as regards, (a) Complete cystoscopic vision, (b) More than 1 cm. from ureteral orifice; (2) Not larger than 2.5 cm. base diameter. No infiltrating tumors. III. *Segmental resection of bladder wall*: for tumors of any size or grade of malignancy if: (1) The growth is limited to the bladder; (2) Removal can be accomplished with a zone of normal bladder wall 1.5 cm. in diameter. IV. *Suprapubic cystotomy with implantation of radon seeds with or without electrocoagulation*: (A) Papillomas too large or unfavorably situated for transurethral treatment or resection; (B) Carcinomas (papillary or flat) no larger than 3 cm. in diameter. Tumors may touch trigone but must be at least 1.5 cm. from urethral orifice. These growths are not resectable and do not infiltrate and prostate. If radon seeds are placed within 1.5 cm. of an ureteral orifice the ureter should be re-implanted in the bladder. V. *Uretero-intestinal anastomosis with removal of bladder and prostate*: (A) Papillomatosis; (B) Multiple papillary carcinomas; (C) Infiltrating carcinomas; (1) Larger than 3 cm. in diameter, (2) Invading the trigone, (3) Infiltrating the prostate, (4) Within 1.5 cm. of urethral orifice; (D) Refractory recurrences after radon implantation or segmental resection; (E) Occasionally when

bladder wall is extensively infiltrated and contracted to relieve frequency, dysuria and ureterovesical obstruction. There should be no more than moderate renal infection. Ureters should be dilated to a diameter no greater than 1.5 cm. Bladder should be movable when palpated bimanually.

VI. *Cutaneous ureterostomy with removal of bladder and prostate:* Used for the same conditions as uretero-intestinal anastomosis when: (A) Dilatation of the ureters is too great, (B) Infection of the kidneys is too great, (C) Function of the kidneys is too poor, (D) General condition of the patient is too bad. Occasionally cutaneous ureterostomy may be performed when palliation is urgently required and further surgery appears impracticable.

VII. *Roentgen therapy:* (A) Contact therapy is indicated for conditions better treated with radon seeds or by resection; (B) High voltage and super voltage (the latter is preferable for tumors as deeply situated as those of the bladder); (1) For palliation in old, feeble patients with extensive anaplastic tumors and minimal ureteral obstruction. 7 tables.—*Author's abstract.*

Infiltrating Carcinoma of the Bladder. Curability by Total Cystectomy. *Hugh J. Jewett and Evan L. Lewis (Capt., M. C., A.U.S.), Johns Hopkins Hospital, Baltimore, Md.* J. Urol. 60:107-112, July 1948.

The 54 cases of total cystectomy in which microscopic sections of the tumor had been made at the site of deepest penetration of the bladder wall were divided into groups as follows: *group A:* no infiltration beyond submucosa, 9 cases; *group B-1:* superficial muscular infiltration, 4; *group B-2:* deep muscular infiltration, 6; *group C:* complete penetration of bladder wall, 35 cases. The most important and accurate single clinical method for distinguishing between deep and superficial tumors is bimanual pelvic examination under anesthesia. Cure by radical surgery should not be expected if a rubbery or stony mass is palpable in the bladder wall (if induration is known to be neoplastic) because infiltration is deep. Ordinarily the prognosis is good if no mass can be felt. Accurate palpation, however, is not always possible when the tumor is situated behind the pubis or in front of the cervix uteri. In the 40 cases in this series so examined, a rubbery or stony mass was felt in all 31 cases which exhibited deep infiltration in microscopic slides. Pelvic palpation afforded a correct impression in 5 of 8 cases with superficial infiltration (errors were result of inability to differentiate between inflammatory and neoplastic induration by palpation). One of the 4 deaths in group A and 1 death in group B-1 resulted from recurrence of carcinoma. These recurrences probably resulted from implantation through spillage during cystectomy. One patient in group B-1 is able to work regularly more than six years after uretero-intestinal implantation and total cystectomy for an extremely malignant bladder tumor. Five of the 6 patients in group B-2 are dead, 5 having died with carcinoma and 2 having died (four and five years, respectively) with clinical evidence of carcinoma (no autopsy, however). Of the 35 patients in group C, 22 have died with carcinoma and 1 other is known to have recurrent cancer. None of the 8 who died without evidence of carcinoma lived for three years following operation. All patients with epidermoid or undifferentiated carcinoma have survived less

than two years after operation. In this group cure by cystectomy appears to be almost impossible. 2 references. 5 tables.

**Disappearance of Carcinomatous Ulceration of Bladder Following Ureterosigmoidostomy. Report of Two Cases. *Edwin Davis, Omaha, Neb.* J.A.M.A. 137:450-53, May 29, 1948.**

The purpose of this publication is to report the clinical disappearance of carcinomatous ulceration of the bladder following diversion of the urinary stream, and to point out the possible biologic significance of this phenomenon in connection with the cause of certain tumors of the bladder. These observations are based on repeated cystoscopic studies confirmed by preoperative biopsy and by subsequent gross and microscopic examination of the excised bladder by competent pathologists. The obvious inference that these tumors were caused by a carcinogenic urinary ingredient is thought provoking and involves a consideration of the closely related subject of chemical carcinogenesis, which may be defined as the production of malignant, transplantable, metastasizing new growths in laboratory animals or human beings by the action of cancer-producing chemicals introduced into the body, intentionally or inadvertently, by ingestion, inhalation, injection or cutaneous application.<sup>1</sup> It was a consideration of the strange habits of bladder tumors, characterized by a strong tendency to multiplicity and to repeated reappearance (as distinguished from recurrence) elsewhere in the bladder following transurethral destruction, as well as of the extraordinary and intriguing facts in connection with aniline bladder tumors suggesting a urine-borne carcinogen, which prompted speculation as to what might have resulted following diversion of the urinary stream, and led to cystoscopic examination seven weeks after bilateral ureterosigmoidostomy, and immediately preceding cystectomy.

Upon this occasion the most minute and careful inspection by two observers failed to reveal the slightest evidence of the rounded, crater-like, bleeding ulceration (2 cm. in diameter) previously seen, biopsy specimens from which had been diagnosed as carcinoma by two competent pathologists. Likewise, careful gross inspection of the excised bladder following cystectomy showed normal mucosa throughout, without the slightest evidence of intravesical new growth or extravesical extension. However, microscopic section of the wall of the bladder showed cancer cells in the tissues underlying the normal mucosa in each case. These (almost) identical observations were subsequently repeated in another case. The patients were both male, aged 56 and 60 respectively, each complaining of hematuria without other symptoms or findings of consequence. Each is alive and engaged in active work eighteen and thirty months respectively following cystectomy. It is to be clearly understood that it is not proposed to advocate ureterosigmoidostomy as a therapeutic or curative measure but rather to direct attention to the possible biologic significance of this phenomenon. It is true, however, that in cases in which the bladder tumor is not amenable to recognized methods of treatment, diversion of the urinary stream, as a palliative measure, may provide a gratifying degree of symp-

tomatic relief, and, incidentally, an opportunity for observation and for accumulation of data, and to this end cystoscopic examination after ureterosigmoidostomy is urged. Since ample experimental and clinical evidence has been cited to provide precedent for the presence of a carcinogen (exogenous or endogenous in origin) these observations may further the knowledge concerning the origin of certain tumors of the bladder. The fact that cancer cells were showed to persist in the deeper tissues does not detract from the biologic significance of the complete disappearance of the intravesical portion of the tumors. In the event that the inference concerning a urine-borne carcinogen is correct, confirmation by the development of tumors of the rectosigmoid after ureterosigmoidostomy is to be viewed as a possibility. 23 references. 1 figure.—*Author's abstract.*

**Urologic Complications of Left Colon Surgery.** Clarence G. Bandler and Philip R. Roen, *New York Post-Graduate Medical School and Hospital, New York, N. Y.* Ann. Surg. 128:80-88, July 1948.

In 15 of 100 cases of left colon surgery, complications have been sufficiently severe to require urologic consultation and care. Analysis indicates that men are most often affected and that the surgery is usually abdominoperineal. A few illustrative case reports are included. There is danger of inadvertent, right ureteral injury unless the surgeon is as careful of the right ureter, seemingly situated far from the left colon, as he is of the left. Should evidence of ureteral damage appear, the source of the drainage should be immediately established by urologic investigation. If ureteral injury is realized at the time of surgery, either end to end anastomosis or repair of the ureter over a splinting catheter may be made. Sometimes the bladder is injured accidentally, one of the most common injuries resulting from a suture being taken through the bladder wall. The subsequent tissue necrosis produces a small opening in the posterior vesical aspect, usually on the tenth to fourteenth postoperative day. Unless the defect is a huge one, conservative management is advisable. Such management consists of keeping the bladder in a contracted state and diverting the urine for a minimum of two weeks from the time of the appearance of urinary drainage. In the beginning vesical drainage must be differentiated from ureteral fistula by urography and cystoscopy.

Vesical dysfunction is probably the most troublesome and frequent urinary complication following pelvic colon surgery, and in 12 of the 15 cases in this series the complication was of this character. Although injury to the autonomic nervous system during mobilization and excision of the distal colon is the most common explanation, there are three other important etiologic elements: direct trauma to the bladder; prostatic obstruction; and postoperative sagging of the bladder. If, preoperatively, there is a history of urinary difficulty or if direct questioning or careful examination suggests bladder problems, urologic survey and cystoscopy are indicated; and if vesical neck obstruction is found, transurethral resection should be done prior to colon surgery. Postoperative

management of vesical dysfunction begins in the operating room with the introduction of a No. 16 F. or 18 F. soft rubber, retention catheter. One of the sulfonamides should be given prophylactically and bladder irrigation (any suitable solution) should be carried out a minimum of three times daily. Mecholyl bromide (200 mg. three times daily) was found to be the most effective of the parasympathetic stimulant drugs given for the purpose of overcoming the effect of operative trauma to the autonomic nerves supplying the bladder. The retention catheter may be removed on about the fifth day of this regimen but even though the patient may void spontaneously, catheterization for residual should be done at the end of an eight hour period. If more than 100 cc. is obtained as residual, a retention catheter should again be inserted for several days (check for residual after its removal also). Cystoscopy is indicated when difficulty in urination and a large residual urine persist, further therapy being determined by the cystoscopic findings. 9 references, 1 table, 4 figures.

## 12. Urethra and Glands

Construction of the Terminal Urethra in Correction of Hypospadias.  
*Joseph H. Kiefer, University of Illinois College of Medicine and St. Joseph's Hospital, Chicago, Ill.* J. Urol. 59:1169-73, June 1948.

A method is presented for constructing the terminal portion of the urethra in cases of hypospadias. At the time the straightening operation is done, the largest possible amount of foreskin is transplanted from the dorsal to the ventral surface. This is later used to construct a tube graft which is then placed through a tunnel and brought out through the dimple in the glans. This gives a very normal appearing urethral meatus in a normal location. The more proximal portion of the urethra can be constructed at a later time or in some cases at the same time. 3 figures.—*Author's abstract.*

Surgery of Urethral Stricture. *Walter Galbraith, London, England.* Lancet 2:11-15, July 3, 1948.

Urethral strictures are becoming less common. They have a slow and insidious development. Five per cent occur within five years of the original infection and the average latent interval is twenty-five and one-half years. The oldest treatment is dilatation. In using it, there must be extreme gentleness in instrumentation and regular repetition of the treatment throughout the patient's life. Failure after dilatation may be caused by great density of the stricture, acute sepsis, calculi, irritable stricture and inability to stand the discomfort or pain of repeated dilatation. Resilient stricture is rare and such cases are best treated by continuous dilatation. Surgery is indicated for impassable and impermeable strictures. In acute retention very little urethral instrumentation should be used because severe reactions and uremia are readily produced. A suprapubic cystostomy should be done. Traumatic lesions of the urethra are of 3 kinds: (1) those from direct wounding; (2) those from periurethral bruising; (3) those associated with fractured pelvis. Gen-

tle catheterization is permissible in treating these injuries. If this fails it may be necessary to drain the bladder suprapubically, avoiding local treatment until later. Immediate repair is necessary in urethral rupture with fractured pelvis, to avoid development of a serious obstruction. If delayed operation of any of these cases is necessary, one should wait until all local complications and sepsis are over. The site and form of the lesion may be revealed by an intravenous pyelogram. Endoscopic prostatic surgery may cause traumatic stricture. Dilatation is often satisfactory for stricture from chronic prostatitis, but the retropubic approach may better answer this problem.

Urethral stricture is more common than supposed in the female and it is a serious condition. This is expected, for in the male a stricture becomes more serious as its site approaches the bladder and the female urethra corresponds with the posterior urethra of the male. If local infective complications arise at a stricture, a suprapubic cystostomy is preferable to a local surgical attack. External urethrotomy is seldom done because of recontraction of the stricture. The Syme operation needs a passable stricture, which is better treated by other means. The Wheelhouse operation is better but it is difficult to trace the lumen through the actual stricture and to find the urethra proximal to the stricture. The Loughnane operation is useful, since the stricture is bypassed by a catheter buried alongside it and lying in the urethra above and below. This passage becomes epithelialized from each end and is treated by dilatation. Internal urethrotomy is unsatisfactory but is useful when a quick result is necessary, in true resilient stricture, and when patients cannot come in regularly. When all affected tissues can be removed, excision is probably the best treatment. It is necessary to do preliminary cystostomy and a free mobilization of the urethra above and below the stricture. Strictures of the prostatic and membranous urethra may be treated by excision and dilatation.

Roentgen Therapy of Carcinoma of Female Urethra and Vulva.  
*Franz Buschke and Simeon T. Cantril, Swedish Hospital, Seattle, Wash.*  
Radiology 51:155-65, August 1948.

It is the purpose of this publication to demonstrate that, contrary to a quite prevalent assumption that roentgenotherapy in adequate doses is not tolerated by the vulvar mucosa, curative results with good function can be accomplished with proper selection of cases and careful attention to details of the treatment procedure, particularly the quality of radiation and the time distribution. Four cases of carcinoma of the female urethra and 8 cases of locally advanced inoperable carcinoma of the vulva were treated with external roentgenotherapy to the primary lesion (200 kv., 2 mm. Cu). Of the 4 cases of carcinoma of the female urethra, 3 are well for periods of five, four and two years respectively; 1 is alive with lymphatic spread. Of the 8 cases of carcinoma of the vulva, too advanced for surgical removal, 5 are well, 7, 4½, 2½, 2½, and 1¼ years respectively. Three are dead, all from metastases. For the small fields necessary to include the urethra, (3 to 3.5 cm. diameter) doses up to 5,000 r (measured on the skin) in about

twenty-five days are tolerated by the mucous membrane. A higher dose given in 1 case (5,650 r in twenty days) led to severe reaction with some permanent scarring stricture in spite of controlled disease. For the less differentiated tumors of the vulva, doses between 4,000 and 4,500 r in twenty to twenty-six days were found sufficient and were well tolerated even over the larger areas. Because of the unavoidable mucosal reaction, roentgenotherapy is not considered as the treatment of choice for all cases. The authors feel that it has undoubted preference in early carcinoma of the urethra and perineal vulva in which surgery would be mutilating and in advanced carcinomas of the vulva which are beyond surgery. For small carcinomas in the labia, clitoris and commissures, surgical excision is preferable. Roentgenotherapy is contraindicated in carcinoma of the vulva on the basis of leukoplakia where it leads to necrosis without control of disease. The management of the regional lymph nodes is not discussed. 4 references. 2 tables. 12 figures.—*Author's abstract.*

### 13. Penis

The Value of Radical Operation for Carcinoma of the Penis. *Perry B. Hudson, James F. Cason and William Wallace Scott, The Johns Hopkins Hospital, Baltimore, Md.* South. M. J. 41:761-65, September 1948.

A re-evaluation of radical surgery for carcinoma of the penis has been made. Seventy consecutive cases in which pathologic study was adequate served as source material for the study. A standard policy of radical operation for all cases of carcinoma of the penis has been in effect at the Brady Urological Institute for many years. Such a policy makes possible rational appraisal of ultimate results. All of the radical procedures employed were of one or the other of two types suggested by Hugh H. Young. The over-all mortality rate for such surgery is 7.1 per cent. One-half of the entire series of cases were metastatic at the time of operation. This condition could not accurately be diagnosed prior to surgery. Negative biopsies are found to be misleading. Five-year survival rate of all patients was 45.6 per cent after radical surgery. (Fifty-five per cent of nonmetastatic cases and 31.5 per cent of the metastatic lesions.) It is noted that histopathology of either biopsied tissue or of the entire tumor cannot be depended upon as a basis for prognosis in any particular case. The preoperative inability to distinguish between metastatic and nonmetastatic carcinoma, plus the fact that even metastatic tumors are curable suggest strongly the advisability of routine radical operation whenever a diagnosis of penile cancer is made. 6 references. 3 tables. 3 figures.—*Author's abstract.*

### 14. Urine and Semen

Spontaneous Myohemoglobinuria in Man. Description of a Case with Recurrent Attacks. *Frederick L. Kreutzer, Louis Strait and William J. Kerr, University of California Medical School, San Francisco, Calif.* Arch. Int. Med. 81:249-59, March 1948.

Spontaneous myohemoglobinuria is characterized by the appearance

of myohemoglobin in the urine combined with evidence of muscle dysfunction and without significant precipitating trauma or toxic agent. Myohemoglobin is a muscle protein and in general its properties are similar to those of blood hemoglobin. It probably functions by taking oxygen from the blood and holding it in the muscle cell. Published reports of frank cases are very rare. It may occur in either men or women and at any age. The history is that of muscular pain, spasm and weakness after exercise followed by the appearance of colored urine which may vary from reddish to nearly black. This urine will give a positive reaction for occult blood without hematuria. There may be other pigments excreted along with pigmented casts, albumin and creatine. The patient may die with his initial attack or survive many such. Some of the deaths may be due to the development of a lower nephron anuria. It has been suggested, based upon work done on a similar equine disease, that there is an unusually rapid breakdown of glycogen from glycogen-rich muscles with a resulting high production of lactic acid and further direct damage of muscle with release of myohemoglobin. There is a toxic myohemoglobinuria which results from the ingestion of certain resinous products of which pimaric and abietic acids may be the agents. Another type of myohemoglobinuria is seen in the crush syndrome. With the restoration of circulation blood volume the victims pass urine with myohemoglobin. They may go on to an anuria with fatal issue or survive. Recent work by Truetta and others have classed this under the general heading of the lower nephron syndrome.

A case with recurrent attacks illustrates some aspects of the disease. The patient was a 39 year old white male who had had many episodes of leg muscle cramps after relatively slight strain associated with a subsequent outpouring of dark urine. Examination showed only a moderate wasting and weakness of his proximal limb muscles such as is seen in early progressive muscular dystrophy. On being made to do a squatting exercise he very shortly developed severe pain, spasm and weakness in his thigh muscles. A residual soreness and weakness remained for two weeks and during this time another attack could not be provoked. His pre-strain urine was normal. In the succeeding eight hours it became a dark mahogany color, clearing by the next day. Coincident with the color myohemoglobin appeared. There was also an associated, albuminuria, creatinuria and many pigmented casts. The results of extensive laboratory studies were not such as to support the theory of rapid glycolysis of muscle as the disease cause. Myohemoglobinuria should be considered in a patient with dark urine yielding a positive reaction for occult blood and in the absence of hematuria. The differential diagnoses include acute porphyria; since the porphyrins do not give a positive occult blood test this is the basis for a simple laboratory separation. Generally the clinical story will rule out the hemoglobinurias. Syphilitic paroxysmal hemoglobinuria is precipitated by chilling and there may be a positive Donath-Landsteiner reaction indicating an autohemolysis. The benignity of march hemoglobinuria and its necessary production by very severe exercise gives a basis for distinguishing it from myohemoglobinuria. 25 references, 3 tables, 2 figures.—*Author's abstract.*

The Colorimetric Estimation of Stilboestrol, Hexoestrol and Their Glucuronides in Urine. *F. H. Malpress, Queen's University, Belfast, Ireland.* Biochem. J. 43:132-36, No. 1, 1948.

Methods of preliminary extraction are described which allow estimations of stilbestrol, hexestrol and their glucuronides to be made in cow or human urine by the nitration method of Malpress (1945). After addition to human urine, 80 per cent or more of these substances were recovered, except for stilbestrol glucuronide where the figure was decreased to 63 per cent by decomposition during hydrolysis. Recoveries from cow urine were slightly lower in all instances. Estrogen excretion has been studied after oral administration of 5 Gm. of stilbestrol to a cow. During a control period fairly constant blank values of 50 and 3 mg. daily were obtained for the free and conjugated extraction processes in terms of estrogen equivalents and increases in these values greater than 25 and 3 mg., respectively after giving estrogen, could be ascribed to the effects of treatment. Excretion studies are to be done on man and it is evident from the blank values to be expected (0.5 mg. for free and 1.5 mg. for combined estrogen in a twenty-four hour sample) that the sensitivity of the methods should be much greater when thus applied. Excretions of 0.5 mg. of stilbesterol or hexestrol daily, either free or combined, should be easily detectable and larger amounts should be estimated accurately. The low recoveries of conjugated estrogen reported from the urines of animals are probably caused by failure to appreciate the solubility of glucuronides in organic solvents, and, chiefly, by the losses entailed when hydrolysis is done on urine itself, rather than on suitably prepared extracts. An excretion is reported of amounts up to 6 per cent of the estrogens given to humans as a sulfate ester. The absence of detectable change in the excretion of ethereal sulfate after giving synthetic estrogens to rabbits and the occurrence of doubtful changes in the ethereal S:inorganic S ratio in the cow suggests that these substances are normally excreted either in the free form or combined as glucuronide. 11 references, 3 tables, 1 figure.

An Evaluation of Infertility Factors. *Edmund W. Overstreet, University of California Medical School, San Francisco, Calif.* California Med. 69:32-36, July 1948.

The five chief etiologic factors of infertility are the coital, male, tubal, female endocrine and cervical (and vaginal) factors. These are briefly discussed. A close coital history plus a Huhner's test after coition should give adequate information concerning the part played by this factor. Unfortunately, it occasionally happens that the history indicates satisfactory coition whereas actually male impotence, dyspareunia or unannounced coital techniques are a real factor in the infertility. The psychosomatic factor of sex adjustment is important and must be considered but it is well known that pregnancy often occurs after poor coition. The male factor is much more important than generally realized. Most studies place its incidence at from 30 to 40 per cent. A spermanalysis is often either not done or inadequately done, consisting merely of a quick look through a micro-

scope at a specimen of semen to see if it contains motile spermatozoa. The minimum adequate semen analysis includes determination of volume, viscosity and abnormal contents; a careful sperm count with properly stained differential count of abnormal forms; and an accurate estimate of the per cent of motile sperms at different intervals during twenty-four hours at room temperature. Such an analysis may result in a simple correction of the condition with early resulting pregnancy. The tubal factor is a major cause of infertility in 40 to 50 per cent of cases. The physiology, pathology, study and treatment of tubal dysfunction are well understood. A single tubal insufflation or hysterosalpingogram is subject to a 10 per cent error so that repeated tests are necessary, sometimes under the influence of a sedative or anesthesia. Reports of the incidence of significant anovulation in female infertility have varied from 6 to 50 per cent. A figure of 13.3 per cent is considered fairly accurate. A great deal of attention is given to treatment of this factor though no adequate method of direct or immediate stimulation of ovulation has yet been devised. The use of hormone therapy to correct this condition has increased in general use but decreased among the more capable physicians. The cervical factor is perhaps the least understood cause of infertility but is important and urgently needs more study. A postcoital Huhner test is essential to any real infertility study but it is frequently omitted. A recent careful study of the incidence of the cervical factor in a series of 50 cases of infertility showed it to be 70 per cent. Other perhaps more important infertility factors were also present in these cases. Study of patients in the area investigated showed an average of 2.4 infertility factors present per couple. The Huhner test has not yet been sufficiently developed to be completely satisfactory however, a better technic being essential. Rh incompatibility has also been advanced as a cause of infertility but it has been showed that this is not a cause of early abortion and probably not of infertility. 15 references. 2 tables.

Treatment of Sterility. Insemination Timed by Rat Ovulation Test (Report of Thirty-Two Cases). *Douglas P. Murphy and Edmond J. Farris, University of Pennsylvania, and the Wistar Institute of Anatomy and Biology, Philadelphia, Pa.* J.A.M.A. 138:13-14, Sept. 4, 1948.

The rat ovulation test (Farris, 1946) was used to predict the day for the insemination of a series of 32 women. The sperm status of the husband was first analyzed. After five days of sexual abstinence, he produced an ejaculate, and the number of moving sperm was found by diluting seminal fluid 1:20 with Locke's solution in a white cell pipet and examining it under a microscope in a field for red blood cell counting. The number of moving sperm per cubic centimeter of ejaculate was computed and the number in the total ejaculate determined. The patency of the wife's fallopian tubes was determined usually by hysterosalpingography. The probable day of ovulation was then detected by the rat test. The wife was placed in the lithotomy-Trendelenburg position, and the cervical os was exposed. The semen was inserted into the cervix with a 2 cc. tuberculin syringe to which was attached a Bower's antrum cannula; 0.25 cc. of fluid was injected.

The treatment was stopped if the patient experienced any sensation. The speculum blades were then closed until they touched the cervical walls. Cotton was inserted between the perineum and the speculum handle, to depress its vaginal end. This brings the cervix more at right angles to the posterior blade of the speculum, so that the external os faces and is close to the tip of the posterior blade. The remainder of the semen was poured down the posterior blade to cover the cervical os. The patient stayed in position for thirty minutes. Fifty-seven inseminations were done on 32 women and there were 10 conceptions. Eight conceived after one treatment and 2 after the second treatment. Forty-seven inseminations failed, 79 per cent because of an inadequate number of moving sperm or abnormal ovulation. Five unsuccessful cases were treated either on the day before or the day after the predicted ovulation date. Three failures were caused by tubal abnormality. Each patient had insemination only once each month. 4 references.

**Constant Oligospermia and Periodic Oligospermia.** *Bernhard Zondek, Yehuda M. Bromberg and Zeev Polishuk, Rothschild Hadassah University Hospital, Jerusalem, Palestine.* Am. J. Clin. Path. 18:874-78, November 1948.

Repeated semen analyses were made on a selected group of 30 men whom a first sperm examination had indicated to be responsible for barrenness. The wives had been carefully studied and eliminated as a cause. The subjects had no organic disease, chronic intoxication or avitaminosis and no change was made in their dietary habits or environment during this study. Repeated sperm counts showed two distinct types of oligospermia in these 30 subjects. The first group included 21 patients. Their spermatic densities varied from 800,000 to 20,000 per cubic centimeter on the first examination but reached a maximum of 31,500,000 per cubic centimeter in 2 cases on serial examination. The difference between any two spermatozoal counts was not over 12,000,000 per cubic centimeter in any of these cases. Sperm motility and percentage of pathologic forms was fairly constant, the former varying from 0 to 35 per cent in all but 2 patients, while the latter varied between 25 and 62 per cent in all but 2 cases who had 8 and 12 per cent. This group was called constant oligospermia. The second group of 9 patients had markedly different spermatic characteristics in successive specimens. First examinations varied from 2,500,000 to 30,000,000 per cubic centimeter but subsequent examinations showed one or more specimens with over 46,000,000 per cubic centimeter in 4 subjects and over 60,000,000 in the 5 remaining cases. Observed differences in the same patient varied as much as 43,000,000 per cubic centimeter, the number usually approaching normal levels on the fourth or fifth examination. The sperm motility in this group varied from 20 to 75 per cent and pathologic forms between 10 and 35 per cent. This group was called periodic oligospermia. Results of this study show the importance of repeated sperm examinations in evaluating male fertility, at least five semen analyses being made after four days' abstinence from coitus before a definite conclusion can be drawn. These results also show how pregnancy may occur with quite low

spermatic counts because the counts in periodic oligospermia occasionally rise high enough to cause conception, fertilization occurring in 2 of 9 women by the second group during this study. These variations also cast doubt upon the value of therapeutic agents for the correction of oligospermia. Therapeutic results should only be assessed after at least five consecutive examinations during two months of men with constant spermatogenesis. 11 references. 1 table. 1 figure.

### 15. Scrotum

*Epithelioma of Scrotum. Archie L. Dean, Memorial Hospital, New York, N. Y. J. Urol. 61:508-18, September 1948.*

In the 27 cases of scrotal epithelioma discussed here, the most common cause was contact with petroleum and its products, particularly in the refineries. However, exposure to other cancerigenic agents (tar, pitch, soot and crude wool) accounted for some of the cases. Eight patients were employed where such occupational hazards were lacking but 2 of these had received Fowler's solution for psoriasis and 1 other had had repeated roentgen irradiation of the scrotum (followed by telangiectases, fibrosis and neoplasm). Eight patients exhibited primary cancers as well as the scrotal cancers. Usually a warty growth developed on the most dependent portion of the serotum following many years' exposure to the cancerigenic agent. Pain and ulceration then appeared within three to twelve months and in some cases metastatic nodules were evident in the groins one year later. Most of the tumors were squamous carcinoma grade 2. Any suspicious case should be subjected to biopsy promptly. The treatment of choice is wide surgical excision, carried out promptly after diagnosis. Involvement of the inguinal nodes requires radical groin dissections but if involvement is doubtful and the patient can be carefully observed, radical groin dissection may be postponed until microscopic verification of groin metastases is obtained. When this practice has been followed, there has been, at this hospital, no cases of subsequent spread of the metastatic processes beyond the nodes under study. Demonstrable metastases were absent at initial examination in 11 of the 27 patients; 4 of these are alive five or more years after treatment. Metastatic processes were demonstrable in 16 patients at the first examination; 2 of these are living five or more years following treatment. Eleven of the cases are briefly reported. 2 tables. 7 figures.

### 16. Testis

*The Distribution of the Testicular Artery (Internal Spermatic Artery) to the Human Testis. R. G. Harrison and A. E. Barclay, University of Oxford, Oxford, England. Brit. J. Urol. 20:57-66, June 1948.*

This study of the vascularization of the human testis was prompted by the discrepancies noted in the literature from the time of Regnerus

de Graaf (1677) concerning the mode of termination of the testicular artery in the testis. Various anatomists, as well as some contemporary textbooks, have described the testicular artery as passing directly into the testis through the mediastinum, whereas in a comparative study of the vascular supply of the mammalian testis the artery (except in the whale, Globicephala, the only testicord mammal so far examined) was found to ramify on the surface of the testis before passing into its substance. The vascular pattern was investigated by the methods of arteriography and micro-arteriography in fifteen specimens from 9 individuals, aged 10 to 65 years, after the injection of radiopaque media into the testicular vessels. There is some variation in the manner of distribution of the testicular artery; after giving off branches to the cord and epididymis it may remain undivided or divided into as many as four branches. Most frequently two branches are formed and these become distributed over the free surface of the testis on the deep aspect of the tunica albuginea. From this superficial network in the tunica vasculosa terminal branches pass into the testis towards the mediastinum along the septa, usually bending back before reaching it to form centrifugal vessels. The blood supply of the epididymis is also described. The venous drainage of the testis takes place mainly by vessels lying in the substance of the testis which converge towards its posterior border to form the pampini form venous plexus. Some large anastomotic venous channels running through the substance of the testis are also described. In order to preserve spermatogenesis it is desirable to conserve the testicular vessels in the operation of orchiopexy. In the Keetley-Torek operation the tunica albuginea is stitched to the fascia lata. If the testicular artery or its branches pass on to the lateral surface of the testis, it is possible that such stitches may inadvertently ligate the only blood supply to the testis. Such a danger also exists in the operation for testicular fixation in torsion of the spermatic cord. 28 references, 8 figures.—*Author's abstract.*

Malignant Disease of the Testis. *John Broughton, Newcastle, Australia.* M.J. Australia 2:204-205, Aug. 21, 1948.

During World War II, almost 1,000 patients with tumor of the testicle were treated at the urological service of Walter Reed Hospital, Washington, D. C., and on the basis of pathologic studies of these cases, the U. S. Army Institute of Pathology has presented a classification of tumors of the testis, which the author considers the most practical classification in outlining the plan of treatment of each case. In this classification all neoplasms are considered as belonging to one of two groups, the complex teratomas or the monocellular tumors, such as seminomas and carcinomas. The important structural types are classified as: teratoma; seminoma; embryonal carcinoma; chorioepithelioma; teratocarcinoma; interstitial cell tumor. Teratomas are characterized by the complexity of the histologic picture which shows elements derived from all three primary germinal layers; even in the absence of recognizable malignant components, these tumors should never be considered to be benign.

Seminomas consist of uniform cells that are rounded and polyhedral, often with clear cytoplasm and with the nuclei and the nucleoli centrally placed. In embryonal carcinoma, the cells are larger than in seminoma and the nuclei do not show the same orderly pattern; there may be considerable variation in cellular types in different tumors and even in the same tumor but the characteristic feature is the resemblance to cytотrophoblastic tissue; syncytial trophoblastic elements may be present. Chorioepithelioma shows the same structure as placental villi. Teratocarcinoma is a combination of teratoma and seminoma, embryonal carcinoma or chorioepithelioma. Interstitial cell tumors are not necessarily malignant; the cells resemble Leydig cells or those of the adrenal cortex. While a close correlation between the histologic structure of a tumor of the testicle and the urinary hormone content as determined by the Aschheim-Zondek test has not yet been established definitely, it has been found that if the hormone content is above 2,000 mouse units per liter, the prognosis is unfavorable. At Walter Reed Hospital, the earlier cases in the series were treated by orchidectomy followed by irradiation of the retroperitoneal area, using a dosage limited only by skin tolerance, usually 6,000 to 8,000 r. But this was followed in many cases by fibrosis of the abdominal wall and/or serious gastrointestinal complications. After 1942, a preliminary course of irradiation was given, followed by orchidectomy and the effect of the irradiation on the tumor was determined. It was found that 3,000 r through five portals gave adequate dosage in the treatment of seminoma; 5,000 r might be sufficient for embryonal carcinoma; but that all tumors containing trophoblastic elements were definitely radio-resistant. Following this the radical operation was done in all cases in which the tumor contained radio-resistant elements, after careful search by clinical and roentgenologic study had been made for metastases. While the true value of the radical operation in malignant tumors of the testis cannot be determined until the five year results of the Walter Reed Hospital series are available, the author is of the opinion that this operation is indicated in cases where it offers a possibility of cure.

12 references.

Prognosis of Testicular Tumors. *John K. Ormond and John W. Best, Henry Ford Hospital, Detroit, Mich.* J. Urol. 60:272-79, August 1948.

This report is the result of a survey of 40 testicular tumors seen at the Henry Ford Hospital between 1923 and 1948. Pathologic types were: embryonal carcinoma 19; teratoma 8; seminoma 6; chorioepithelioma 3; interstitial cell tumor 1; unclassified 3. These were arbitrarily divided into two groups: (1) those occurring in men under 30 years old; (2) in those above the age of 30. Group 1, 8 cases; group 2, 32 cases. These were again divided into those which had demonstrable metastases when first seen by us, and those who had no demonstrable metastases when first seen. In this small series the hormone test gave no help either in diagnosis or prognosis; and no connection could be found between pathologic type and prognosis. The factors influencing

prognosis seemed to be age, presence or absence of demonstrable metastases, and promptness and method of treatment.

In group 1 the duration of symptoms prior to treatment averaged 7.8 months less than in group 2. In spite of this 62.5 per cent of group 1 presented with metastases in contradistinction to only 28.1 per cent of group 2. Treatment consisted of orchietomy with high ligation of the cord, followed in most instances by postoperative irradiation. No radical operations on the abdominal glands were done. Of the 14 patients who had demonstrable metastases when first seen, all are dead or were obviously dying when last seen. Two of these, treated elsewhere by orchietomy not followed by irradiation, died six and eight years respectively after operation. Of the 26 patients who had no demonstrable metastases when first seen, 3 died within a year of treatment; 2 are untraced, the others are living. However in 4 instances treatment took place less than three years ago, leaving 17 living over three years, with 2 patients untraced.

The prognosis has improved markedly since the introduction of radiation therapy. So far, in this series, there have been no deaths after the first year of patients presenting without demonstrable metastases and treated by orchietomy followed by irradiation. Of 24 traced patients who presented without demonstrable metastases and were treated by orchietomy followed by irradiation, 21 (87.5 per cent) are living, periods ranging from one to twenty years postoperative. The three who died did so within the first year after treatment. Any suspicious enlargement, unusual induration or irregularity of the testicle should receive serious attention. All hydroceles should be scrutinized carefully. Operative exploration should be carried out in every doubtful case. With earlier diagnosis and with the use of operation plus irradiation, the prognosis of malignant tumors of the testicle has improved in the past twenty-five years so that it is now better than the prognosis of such disease of any other organ of the male genitourinary tract except of the penis. 15 references. 3 tables.—*Author's abstract.*

### 17. Epididymis

*See Contents for Related Articles*

### 18. Spermatic Cord and Vas

*See Contents for Related Articles*

### 19. Seminal Vesicles and Ejaculatory Ducts

Primary Carcinoma of the Seminal Vesicle. Report of Two Cases.  
*E. M. Gee, Toronto General Hospital, Toronto, Ont., Canada.* Brit. J. Urol. 20:72-76, June 1948.

Only 21 cases of this disease were recorded between 1883 and 1943 and it was undiagnosed during life in many of these. The first case

here reported was a 65 year old man in whom a routine rectal examination showed a hardened right lobe of the prostate suspected of being cancer. A later examination showed a shotty, nodular area resembling calculi in the right lobe which, together with the right seminal vesicle, felt hard, fixed and matted together. Presence of calculi was confirmed by roentgenogram and it was finally decided that he had a series of stones in the prostate and not carcinoma. Blood in the urine and pain in the back appeared two years later. Roentgenogram then showed only destructive lesions in the ninth rib and tenth thoracic vertebra. The patient slipped in getting off the examining table, found he had become paralyzed in both legs and was readmitted to hospital with a diagnosis of pathologic fracture of the spine. He developed cystitis, pyelonephritis and uremia, dying less than three months later. Autopsy showed primary carcinoma of the seminal vesicle without evidence of prostatic involvement. The second case was a 36 year old man who developed lower abdominal pain passing downward over the pelvis into the external genitals. Seminal vesiculitis was diagnosed but no improvement followed prostatic massages. The abdomen was somewhat distended and tense but a barium enema and series were negative. A firm, slightly nodular and tender pyriform mass about 3 inches long was palpable just above the prostate on the left side at about the beginning of the seminal vesicle. It was external to the rectum and firmly adherent to the pelvic wall. Urinalysis and cystoscopic examination were negative except for a slight resistance to a catheter entering the left ureter. A tuberculin test was mildly positive but courses of sulfonamides, penicillin and streptomycin were all ineffective. An exploratory laparotomy revealed a hard, nodular mass just above the prostate in the seminal vesicle area and extending laterally to invade the left pelvic wall. It was inoperable but was diagnosed carcinoma by biopsy and frozen sections. Death occurred two months later. The first case shows that any small mass in the prostate or vesicle should be investigated by exposure through the perineum and biopsy, followed by radical resection if malignant. The second case was probably inoperable when first seen. 21 references. 3 figures.

## 20. Prostate and Verumontanum

The Prostatic Patient. Preoperative Appraisal and Care. *William Baury's, Guthrie Clinic, Sayre, Pa.* S. Clin. North America 28:1351-59, October 1948.

Obstructive hypertrophy increases in direct ratio with advancing years after 50. For some unknown reason, atrophy of senescence is replaced by hypertrophy in prostatic tissue. Perceptible increase in size is of no consequence as long as obstruction does not occur. Large glands are not always obstructive. Because of the frequency of prostatism in old men, any urinary difficulty is suspected as prostatic obstruction. Patients frequently entertain such impressions. When the examiner finds no interference to urination, the patient should be reassured. There is no practical way of applying pro-

phylaxis against obstruction. Alcoholic excesses and exposure to cold will at times precipitate an obstruction in an incipiently obstructive gland. When an asymptomatic carcinomatous enlargement is diagnosed at a time when it is no longer amenable to radical removal, no treatment is indicated. Many of these malignant prostates are slow growing and remain without producing subjective symptoms for years and the patient may live a normal life time without consciousness of the presence of the growth. No advantage has been demonstrated in the use of hormonal therapy before other than local objective symptoms are apparent. The prostatic patient presents a geriatric, cardiovascular and surgical problem. If physical examination reveals some pathologic process which needs preoperative treatment, this is first administered. We deny operation only to the moribund and the insane. Hypertension, coronary artery disease, previous cerebrovascular and coronary accidents are not recognized as contraindications.

Preoperative indwelling catheter is employed when the patient is completely obstructed or when urination is frequent and painful. Proper rest must be insured. The silver catheter described by Nelse Ockerblad is preferred. Unless some complicating condition exists, a general diet is ordered. Coffee or tea are not restricted. For improving the appetite, alcoholic stimulants may be used. Fluids are encouraged. If the laboratory examination reveals the presence of syphilis, treatment is administered before and after operation. If red cell count and hemoglobin are low, transfusions are necessary because of the usual operative blood loss. Operation is carried out in the presence of urosepsis although treatment is, of course, administered. The blood sedimentation rate has been of little value in our hands in diagnosing a benign or malignant gland. Blood urea nitrogen determination is among the most important of the laboratory studies. When nitrogen retention is high, we treat with fluids until a stable point is reached. Operation in the presence of a blood urea even as high as 100 is not a contraindication as long as further treatment does not reduce it.

Alkaline and acid phosphatase determinations are made routinely. A high acid phosphatase level means prostatic carcinoma in spite of the finding of a gland of normal consistency. Almost every gland with bony metastases will show a high acid phosphatase blood level but only about one-third of malignant glands without metastases will show an increase. Intravenous urograms are made in every case. No elaborate sensitivity tests have been made by us. Two cubic centimeters of neoipax are administered and if after a wait of three minutes, there is no reaction, we administer the remainder. Severe nausea, tightness in the chest or other significant symptoms are accepted as a signal to intercept further administration. The roentgen studies are examined for calculi, evidence of metastases and pyelography. Diverticula are also demonstrated in most instances. Calcium, vitamins and sulfonamides are prescribed routinely. About 15 per cent of patients show signs of sensitivity to sulfonamides. Where the drug is tolerated, we consider it the most satisfactory preparation for treating urosepsis. Ammonium mandelate is our second choice. Penicillin is a poor third and streptomycin is tried where the others have failed. The various preparations which color

the urine are useful in alleviating irritation. They have no bacteriostatic value. 4 references.—*Author's abstract.*

Evaluation of Transurethral Prostatectomy. *John A. Taylor and Charles A. Place, St. Luke's Hospital, New York, N. Y.* J.A.M.A. 139:144-46, Jan. 15, 1949.

Transurethral resection was done in 1,066 cases of prostatism at St. Luke's Hospital between 1935 and 1945. The average age of the patients in this series was 66.55 years; the oldest patient was 96. The lesion was benign in 957 cases and in 109 cases there was carcinoma with retention. Transsacral block was used for anesthesia in the first five years but since 1940 the method of lumbosacral subarachnoid tap has been employed. In 205 cases (19.3 per cent) another resection was done before the patient was discharged from the hospital, as patients are not allowed to leave the hospital until they can empty the bladder normally. There was postoperative hemorrhage in 18 cases (1.7 per cent) so severe that the patients had to be returned to the operating room. In 12 cases, the hemorrhage was controlled by the evacuation of clots and fulguration of the bleeding point; in 6 cases suprapubic operation was necessary. There were 5 postoperative deaths in this series; considering the age group with its concurrent cardiovascular changes and the fact that transurethral resection was done in many cases when the blood urea was at a high level, this low mortality shows that the operation is a minimal risk procedure. In 16 cases (1.5 per cent) stricture of the urethra followed operation, in spite of careful technic in dilating the urethra gradually and introducing the resectoscope. There were 3 cases in which incontinence developed. Toward the end of the series, it was found that some patients, after several years without symptoms, had recurrent retention or hemorrhage. There were 20 cases of carcinoma, in which recurrence might be expected; there were 58 cases of retention, 39 cases of hemorrhage and 22 cases of prostatic calculi (primary in 14 cases, recurrent in 8 cases) in which another resection was necessary one to twelve years after the first operation; the average interval between resections in these cases was 6.7 years. The incidence of infection in transurethral resection has been greatly reduced by the use of antibiotics, avoidance of the use of the indwelling catheter preoperatively whenever possible and early removal postoperatively and having patients empty their bladders before discharge from the hospital. On the basis of their experience with transurethral resection in the treatment of prostatism, the authors have come to the conclusion that this operation is not the method of choice for all cases; they now employ this procedure in 70 per cent of their cases. In the remaining 30 per cent surgical enucleation is done, including cases in the younger age groups, cases of very large prostates in patients who are good surgical risks, and cases in which patients come from remote regions, where they cannot be followed up if late complications develop.

Transurethral Prostatic Resection in Cases of Blood Dyscrasias.  
*Laurence F. Greene and Frank J. Heck, Mayo Clinic, Rochester, Minn.* J. Urol. 60:247-53, August 1948.

Transurethral prostatic resection presents no added risk for the patient with pernicious anemia provided adequate dosage of liver extract is employed. One or two extra doses of liver extract, before and after operation, may be indicated in cases of acute infection, particularly in the presence of subacute combined sclerosis. Preoperative blood transfusions are seldom required. There is a slightly increased risk in cases of chronic myelogenous leukemia but preoperative reduction of the leukocyte count to a reasonable level by means of roentgen or other therapy may be wise. In the presence of marked anemia, preoperative blood transfusions are indicated. Control of bleeding may be difficult in the 1 or 2 per cent who exhibit thrombocytopenia. On the whole operation should not be denied these patients with chronic myelogenous leukemia but the stage of the disease, the prognosis and so forth determine the wisdom of surgery for the prostatic obstruction. Chronic lymphatic leukemia does not necessarily contraindicate transurethral prostatic resection, particularly since the disease may be comparatively benign in patients of this age group. However, thrombocytopenia may increase the risk to the point where surgical intervention is not justified. Usually the prognosis in cases of acute leukemia makes surgical treatment of prostatic obstruction unjustified. In the presence of hemophilia, only the most urgent circumstances warrant transurethral prostatic resection and in such cases 250 to 300 cc. of blood must be given four to eight hours preoperatively and repeated at eight-hour intervals postoperatively. The globulin fraction should be helpful in controlling bleeding. The hemoglobin content and red cell count should be normal before operation.

Repeated venisection for the reduction of the erythrocyte count, hemoglobin concentration and hematocrit reading prior to operation, is necessary for the patient with polycythemia vera. Also the control of the disease by means of radiophosphorus is desirable. Prostatic resection does not involve undue risk for the patient with hemolytic icterus provided he has previously undergone splenectomy. Blood transfusions are felt to be contraindicated in view of the possibility of acute hemolytic crisis. However, when they are imperative, exceedingly careful typing, cross matching and determination of the Rh factor are obligatory. Transurethral prostatic resection offers no materially increased risk to the patient with thrombocytopenic purpura if splenectomy has been done previously. When surgery is imperative in the presence of this disease, the treatment of choice is preoperative and postoperative treatment with blood transfusions, as in hemophilia. The prognosis of aplastic anemia is so uniformly poor that prostatic resection is rarely warranted. In the patient with the chronic form of the disease the surgical risk would be high and many transfusions would be required in order to counteract the bleeding tendency. The records of 40 patients with various blood dyscrasias who underwent transurethral prostatic resection were reviewed. The value of appropriate preoperative and postoperative treatment is showed by the fact that none of

these patients expired after surgery. Although in 40 such cases, carcinoma might be anticipated in 6 to 8 cases, there was not a single instance of a prostatic carcinoma. 1 figure.

Rationale and Results in Retropubic Prostatectomy. *Owsley Grant and Robert Lich, Jr., University of Louisville, Louisville, Ky.* Ann. Surg. 127:1010-21, May 1948.

Although the space of Retzius has always been regarded as a space of potential danger, in the retropubic prostatectomy (as devised and described by Millin) the approach to the prostate is made directly through this space. After a transverse (or vertical) incision, separation of the recti muscles and exposure of the field with a two-blade retractor, a third retractor is used to push back the previously emptied bladder. A gauze pack on either side of the prostate, pushed well under the pubic arch region, serves to isolate the gland and define its extent. When ligating the vessels in the tissue over the prostate, the sutures should be carried deeply (even to entering the capsule) by the needle. Next the prostatic adenoma is loosened from its bed and the urethra is cut across near the prostatic apex with a pair of curved long blade Mayo scissors. Enucleation, beginning at the apex toward the bladder, of the gland is then started either with the finger or blunt scissors. When the vesical neck is reached, the prostate is lifted well into the wound and separated from the bladder by blunt dissection. During the peeling process from the bladder, the prostatic arteries, usually situated at the lower sides of the vesical neck, are often visible and can be caught by clamps before the gland is entirely freed. If they are not clamped at this time, they must be ligated with figure of eight sutures that extend into the base of the capsule. This step is exceedingly important as it keeps blood loss during operation at a minimum and keeps the urine clear postoperatively. The lateral packs are now removed and the bladder examined digitally for calculi and diverticula. The prostatic bed, which should be dry, is inspected under direct vision for tags or nodules. Following gentle irrigation of the bladder, through a catheter introduced from the meatus, for the removal of any clot or detritus, the capsule's cut surfaces are drawn together with continuous sutures which pass well into each side and well into the angles. The rubber tissue drain which is introduced to the suture line in the prostatic capsule and about which the wound is closed completely, is ordinarily removed on the second or third day.

When radical retropubic prostatectomy is done, the steps are the same up to the point of incising the capsule. Following ligation of the veins, retraction of the fatty tissue and visualization of the puboprostatic ligaments are possible. These latter are severed and with the prostate quite free at its apex, the apex is cut across at the triangular ligament and turned toward the bladder with the capsule intact. Separation from the rectum is easily accomplished and the seminal vesicles are clamped and removed with the intact gland if advisable (advisable with some cases of carcinoma but not in cases of fibrous prostate, particularly if calculi are removed with the capsule intact). Next the gland is cut free from the

bladder neck and the latter anastomosed to the distal urethra. If the puboprostatic ligaments are cut, the length of the distal urethra is entirely adequate for the anastomosis. The present series consists of 50 cases and although the follow-up period of five months is inadequate for final judgment, the results to date have been so satisfactory that the procedure is deserving of attention. There was no operative mortality and no cases of fistula, incontinence, epididymitis or serious infection developed. (Similarly satisfactory results have been noted in an additional 45 cases treated since this paper was submitted for publication.) 2 tables, 5 figures.

**Retropubic Prostatectomy.** *George Austen, Jr. and William C. Quinby, Peter Bent Brigham Hospital, Boston, Mass.* New England J. Med. 239:35-45, July 8, 1948.

By comparison with perineal, suprapubic transvesical and transurethral prostatectomy, retropubic prostatectomy has the following advantages: anatomically the approach is simple and direct and sacrifice of important structures or danger to the function of organs is not a problem; excellent exposure of the gland is provided; more complete exposure and examination is possible following enucleation of the hypertrophied lobes; control of bleeding is easier; reconstruction and repair of the prostatic urethra, with watertight closure of the prostatic capsule, is more readily accomplished; the postoperative course is easier for both the patient and hospital personnel; and urinary sepsis is minimal postoperatively. The following disadvantages are listed, though they may be more apparent than real: the approach may be time-consuming and somewhat difficult in the adipose patient or in one with a deep and narrow pelvis in which the gland is located deep at the bottom of a funnel; a previous open cystotomy might cause the retropubic approach to involve more dissection and trauma; control of bleeding from the larger vessels in the endopelvic fascia may not always be easy; edema of the penis might follow ligation and division of the large central vein running longitudinally across the gland's anterior surface since it communicates directly with the deep dorsal vein of the penis; difficulty in reaching the obstructive tissue may be encountered when hypertrophy is limited to a subtrigonal or intravesical median lobe or when enlargement of the lateral lobes is slight; preservation of an intact vesical outlet may be impossible in some cases with hypertrophy of the median lobe only, since enucleation may traumatize and tear the bladder neck; and lastly adequate visualization of, or easy access to, the gland's posterior aspect or apex in the region of the membranous urethra makes this approach less suitable than the perineal route in cases of early prostatic carcinoma when total prostatectomy is indicated.

The technic of the retropubic procedure, as described by Millin and modified by others, is presented in detail with seven drawings illustrating the various steps. The retropubic method of Millin has been used in 20 cases of prostatic obstruction seen at the Peter Bent Brigham Hospital during a fifteen month period ending in September 1947. In general the patients were selected on the basis of a preoperative diag-

nosis of benign prostatic hypertrophy without major complicating diseases of the lower urinary tract. The average age was 70.2 years; the average duration of symptoms, 3.65 years. Obstruction was complete in 4 patients; urinary retention partial in 8; and residual urine minimal in 8. Mild to moderately severe lower urinary tract infection was present in 12 cases on admission. Preoperative, preliminary drainage through a No. 16 F. Foley catheter, averaged 14.4 days.

The average weight of the glands was 42.1 Gm. Postoperatively the urine was clear within twenty-four hours in 9 cases; within forty-eight hours in 8 cases and within seventy-two hours in 3 cases. The suprapubic drain was usually removed on the second or third postoperative day; the urethral catheter after about six and one-half days. The 4 instances of suprapubic seepage were considered the result of inadequate closure of the prostatic capsule and fascia and faulty adjustment of the urethral catheter. In 1 case acute unilateral pyelonephritis developed on the tenth postoperative day but within thirty-six hours the signs and symptoms had abated. Immediate postoperative hemorrhage occurred in 1 case and delayed minor bleeding in 2 cases. There were no postoperative deaths although 1 patient with benign hypertrophy and an unsuspected carcinoma died from coronary thrombosis three months after surgery. Of the 19 patients living and well, 15 have had no urologic complaints referable to the operation since leaving the hospital. 16 references. 7 figures.

**Life Expectancy in Carcinoma of Prostate. A Five Year Survey of Eighty-Eight Cases. Ralph P. Beatty, Uniontown, Pa. J. Urol. 60:264-71, August 1948.**

This paper includes 88 cases of prostatic cancers representing a five year period. All the cases were followed closely and treated by the usual methods employed in most clinics, with one exception. There were no perineal prostatectomies. In the majority of the cases the malignancy was well advanced when first seen. To exemplify the procedures employed, 20 cases covering the period from August 1945 to August 1946 were presented in detail. The oldest of this group was 83, the youngest 60. The average duration of symptoms, prior to diagnosis, was six months. Where tissue sections were not obtained, the following were considered indisputable evidence of malignancy: weight loss, anemia, elevation of serum acid phosphatase, a fixed, hard or nodular prostate per rectum and roentgen evidence of metastases. Two of the 20 had no obstructive symptoms or signs. The other 18 had obstructive symptoms of variable degree. The results in the recent group of 20 cases were: improved 14, failures 3, deaths 2, lost to observation 1. The procedures employed were: prostatectomy 4, transurethral resection 8, castration 6. All the patients, except those castrated, received stilbestrol in doses of 0.5 mg. three times a day maintaining breast engorgement to the point of discomfort. In considering the entire series of 88 cases, the following statistics were presented: 35 were still living, 26 have died, while 27 were lost to observation. Of the 35 still living, 21 were improved while 14 were classed as failing.

Further analyzing the 35 living cases: 3 were living more than four years, 4 more than three years, 7 more than two years, 3 more than one and one-half years, 8 have lived a year and 10 have been observed for less than a year. This last group belonged in the 20 recent cases. Analysis of the 26 who have died, showed the following: 1 patient died of carcinoma after seven years, 1 survived six and one-half years and died suddenly of coronary occlusion. Autopsy showed no evidence of carcinoma. One survived five years, 1 survived four years, 1 survived three and one-half years, 2 survived three years, 9 survived two years, 3 survived one and one-half years, 5 survived one year and 2 died within six months. The average survival rate was 2.3 years. In 8 who died, death was due to causes unrelated to the carcinoma. Eliminating these raised the survival rate to 2.73 years. Since Aug. 1, 1946, when this paper was written, a resurvey of the 35 who were still living was made, and showed that 7 have died, 5 were failing, 19 were in good health and 4 were listed as unheard from. The series was not a large one and the time interval covered was too short to draw any definite conclusions. However, when one considers that the average life expectancy was formerly a year, even a small series, such as this, gives cause for hope. Unquestionably, the modern endocrine treatment for prostatic cancer, relieves symptoms, improves health and prolongs life. Life expectancy can be further lengthened by early diagnosis, by reduction of latency to weeks instead of months, and by the addition of improved methods of surgical attack on the malignant prostate. No patient in this series was classed as cured of carcinoma.—*Author's abstract.*

Carcinoma of the Prostate with an Evaluation of its Present Day Management. *Joseph C. Birdsall, Philadelphia, Pa.* J. Urol. 59:220-28, February 1948.

A discussion of present diagnostic facilities is presented which includes biopsy with the Silverman needle, a procedure suitable for office use. The instrument has an outer 15 gage cannula and an inner two-pronged needle. In use, the cannula is inserted into the perineum only as far as the area to be biopsied, the inner needle then being inserted through the cannula thus transfixing a piece of tissue between its prongs. Finally the sharp beveled point of the cannula is inserted over the engaged tissue and on proper manipulation a piece of tissue 1 by 10 mm. is obtained. Woodward and Dean's work with serum acid phosphatase content permitted the conclusion that only carcinoma of the prostate will cause elevation of these readings when sodium betaglycerophosphate is used as substrate. Huggins' work (1941) on orchiectomy for the removal of testicular androgens, a notable therapeutic contribution to cases of inoperable prostate carcinoma, is reviewed. In his series of 45 patients, undifferentiated carcinoma was present in all who died (8) or failed to show improvement following orchiectomy. In the failure cases, estrogen administration was ineffectual in inhibiting metastatic processes and controlling pain. Barringer's report in 1941 on the results of radiation therapy by radon needles or seeds applied perineally or suprapublically in 352 cases, showed that of 36 (10 per cent)

who survived more than five years, 15 died of carcinoma between the fifth and tenth year, while the remaining 21 lived from five to nineteen years without evidence of the disease. According to McCrea's report the 15 patients who were treated by bilateral orchiectomy and ethinyl estradiol (0.05 mg. once daily for thirty days, followed by rest periods of thirty days) did not require transurethral resection. Of 184 cases, subjected to Hugh Young's radical operation, 38 who were observed for periods of five to twenty-seven years, presented no evidence of recurrence or metastasis. In the author's series of 132 cases of inoperable prostatic carcinoma treated by removal of large lateral lobes (suprapubic) and punch removal of median obstruction; radon therapy (25 radons of 1 millicurie each); orchiectomy; stibestrol, or transurethral resection, or some combination thereof, 50 lived one to ten years.

The management and therapy for prostatic carcinoma is outlined as follows: (1) Radical extracapsular prostatoseminal vesiculectomy in suitable cases. (2) Suprapubic approach with removal of huge lateral lobes; punch removal of vesical neck obstruction; radon implantation; orchiectomy; and estrogenic therapy to inactivate extragonadal hormones. (3) Median bar type obstruction removed when necessary by transurethral resection or punch method; radon implantation perineally; orchiectomy; and estrogen therapy. (4) Perineal radon implantation; orchiectomy; and estrogen therapy for cases having no or little residual urine. 8 references.

Carcinoma of the Prostate Gland. *C. D. Creevy, University of Minnesota Medical School, Minneapolis, Minn.* J.A.M.A. 138:412-14, Oct. 9, 1948.

Normal development of the prostate requires male sex hormones from normal testes, which elaborate them under the influence of the anterior pituitary. Twenty men with prostatic cancer which had metastasized to bone were castrated and 70 per cent responded favorably. Similar effects are known to follow the use of estrogens without castration. The diagnosis depends primarily on recognizing stony induration. The whole gland becomes hard, nodular and fixed by periprostatic extension. In bone metastases from prostatic carcinoma, the acid phosphatase is elevated. If estrogen therapy produces regression of the lesion, the diagnosis is confirmed. Radical perineal prostatectomy is the only method of bona fide cure but it has many objections. The effects of endocrine therapy are temporary and this therapy is most useful for pain or as a diagnostic measure. It may be preferable to administer estrogens intermittently. The estrogens of choice are diethylstilbestrol and ethinyl estradiol. The dose of the former is 0.5 to 40 mg. and of the latter 0.15 to 2.5 mg. per day. Each drug is best given in a single dose at bedtime. Failure or relapse is treated with doses up to 20 mg. daily; if these fail, castration is done. If pain is severe despite these methods, one should try roentgenotherapy, subarachnoid injection of alcohol and cordotomy.

Carcinoma of the Prostate. A Study of the Postmortem Findings in One Hundred and Seventy-Six Cases. *Falk K. Arnheim, Cook County Hospital, Chicago, Ill.* J. Urol. 60:599-603, October 1948.

The material was drawn from 21,718 postmortem examinations. One hundred and seventy-six cases of carcinoma of the prostate were found. The cases fell into two groups. In 139 cases death was due to the tumor, while in 37 cases the finding of carcinoma was only incidental and not the cause of death. Serial sections of prostates removed at autopsy were not made but in all cases the gross diagnosis of carcinoma was confirmed by microscopic examination. The tumor was an adenocarcinoma in 96 per cent of the cases. The remaining 4 per cent were composed of four squamous cell carcinomas and one transitional cell carcinoma. In the entire series, no gross metastases were discovered in 33 per cent of the cases. Of the 37 cases in which death was not due directly to carcinoma of the prostate, 81 per cent had no demonstrable metastases. Three hundred and twenty-one individual metastases were found. One-third of them were visceral. Most commonly involved were the lungs, liver, pleura, and adrenal gland, in the order mentioned. Lymph node and bone metastases constituted the nonvisceral metastases, 66 per cent. Since the number of individual metastases to lymph nodes represented such a large group, they were studied according to their anatomic location. The most common sites were the iliac and periaortic lymph nodes. The periaortic nodes were more frequently involved than the iliac. The tracheobronchial nodes were the third most commonly involved and the inguinal nodes the fourth. Bone metastases were analyzed in the same manner. It was found that 82 per cent of all bony metastases were in the vertebrae, ribs and pelvis. Invasion of the adjacent urogenital organs, the urinary bladder, seminal vesicles, juxtavesical ureter and vas deferens was considered to be the result of direct extension. Most frequently involved in this manner, was the bladder (44 per cent). Next most commonly invaded were the seminal vesicles (18 per cent).

For purposes of analysis, all cases were divided into ten year groups. No case was found prior to 42 years of age. The oldest case died at 85 years. There was a marked increase in incidence at 60 years of age and 77 per cent of the cases occurred between the ages of 60 and 80. The age distributions of those dying of carcinoma of the prostate and of those in whom it was an incidental finding, were then considered separately. Both groups showed the same sudden increase at the age of 60. The greatest incidence in both groups was between 60 and 80 years. A study of the figures obtained in this series shows that carcinoma of the prostate does not necessarily metastasize. In this series metastases were found in only two-thirds of the cases. Yet it is generally accepted by clinicians that over 95 per cent of the cases of carcinoma of the prostate are inoperable at the time the disease is discovered. Therefore, it would appear that the prognosis of carcinoma of the prostate is poor not only because of metastases but because an early diagnosis is difficult to make since one has to rely chiefly on palpation. The most

striking finding was the similarity in ages between those who died of carcinoma of the prostate and those in whom it was found incidentally at autopsy. Obviously, some factor other than the duration of the disease causes carcinoma of the prostate to be lethal in one individual and not in another. Some malignancies are active while others are quiescent.  
16 references. 2 figures.—*Author's abstract.*

Blastomycosis Involving the Prostate. Report of Two Cases, One with and One Without Cutaneous Lesions. *Morris Moore, Ph.D. and Lawrence K. Halpern, Barnard Free Skin and Cancer Hospital, St. Louis, Mo. J. Urol. 60:612-22, October 1948.*

The first patient, a 56 year old coal miner complained of difficulty in urination. Four weeks after the primary complaint, during which time the prostate was massaged twice weekly, there developed circinate to oval, red, elevated cutaneous lesions with indurated borders and crusted verrucous centers on the face and hip. These lesions were proved to be blastomycosis. Fungi were found on repeated examination of the urine and prostate exudate in spite of intense treatment with potassium iodide by mouth and roentgenotherapy locally to the skin lesions and to the prostate. The second patient, a 64 year old physician who had lived in the coal mining region of southern Illinois, developed urinary frequency, urgency and burning on urination two weeks prior to entering the hospital. Skin lesions did not develop. The prostate was enlarged to approximately three times its normal size. A one-stage suprapubic prostatectomy was performed the day following his admission to the hospital. The urine contained many white blood cells and occasional red blood cells but fungi were not reported. Prostatic tissue removed at the time of operation showed numerous focal abscesses considered to be suppurative and non-specific in origin. On re-examination, fungi were found in these abscesses. Postmortem examination of tissue resulted in the diagnosis of blastomycosis involving the epididymis, prostate, seminal vesicles, adrenals and the lungs in addition to other findings.

Published reports indicate that prostatic infection in patients with blastomycosis is usually part of a generalized systemic involvement. Lung lesions invariably accompanied, and perhaps preceded, those of the prostate, the patients having a cough with the production of a mucopurulent, usually blood-tinted sputum. Of the 2 patients presented, I had a cough and roentgenogram of the lungs revealed congestion at the bases which later cleared. The second case had definite lung involvement as seen in necropsy material and the patient had a cough, the sputum being scanty and not blood-streaked. The source of the organisms for the prostatic involvement in the first case is speculative. It was difficult to prove that lesions were present in other internal organs. External infection could not be proved either although an ascending or descending urinary tract infection might conceivably initiate the prostatitis. In the second case the systemic involvement most probably preceded the prostatic lesion, the fungi possibly reaching the prostate through the blood

stream or by direct extension from genitourinary tract lesions. In the absence of characteristic cutaneous lesions, prostatic blastomycosis may go unrecognized and surgical intervention in such cases may be harmful as was demonstrated in the second case. 4 figures.—*Author's abstract.*

## 21. The Musculoskeletal System

*See Contents for Related Articles*

## 22. The Respiratory System

*See Contents for Related Articles*

## 23. The Cardiovascular System

Types of Essential Hypertension and Their Relationship to Therapy. *Alys Lipscomb, Cleveland Clinic, Cleveland, O.* Cleveland Clin. Quart. 15:166-72, October 1948.

This report is concerned with the manner in which hypertension is classified at the Cleveland Clinic (Research Service). In diagnosing the type of hypertension, the time of onset and the duration are important. Family history should receive careful attention. The signs and symptoms of cerebral vascular insufficiency are important and consist largely of nuchal and occipital pains, paresthesia, vertigo, epistaxis and permanent or temporary paralysis and paresis. The cardiac status in these patients is best determined by estimating the ease with which daily activities are carried on. The most common manifestations of hyperactivity of the autonomic nervous system are a diffuse blotchy red blush over the neck and upper thorax, lacrimation, excessive perspiration and peristalsis. Examination of the ocular fundi is the most important single feature of the physical examination. Diagnostic aids which are often overlooked are appraisal of the degree of medial sclerosis of the peripheral arteries and determination of the presence or absence of pulsations in the vessels of the legs. The degree of cardiac disease may be ascertained by electrocardiogram (using standard and precordial leads) and teleoroentgenogram. Renal vascular integrity may be best measured by the Addis examination if elaborate clearance tests are not used. Intravenous urography and occasionally cystoscopy and retrograde pyelography may be indicated.

Following such an investigation patients may be placed in four distinct and characteristic groups: (1) essential hypertension; (2) malignant phase of essential hypertension; (3) hypertensive diencephalic syndrome; (4) generalized arteriosclerosis with hypertension. True essential hypertension, defined as a disease of unknown etiology and characterized by persistent increased peripheral resistance due to arteriolar constriction with cardiac augmentation and leading to progressive arteriolar sclerosis, ordinarily makes its initial appearance in

the late teens or early twenties. Symptoms of vascular incompetence are evident by the fifth or sixth decades. The duration of the disease is twenty to thirty years, the condition becoming a problem only in during the last ten to fifteen years. The diagnosis of the malignant phase is based upon the presence of hypertensive vascular disease with papilledema and hemorrhagic retinopathy. The age range is 7 to 50 years and although it may occur without warning in a person who has no known vascular disease, it is ordinarily engrafted upon a pre-existing essential hypertension (seldom upon hypertensive diencephalic syndrome). This disease lasts from one to five years and death is most often attributable to renal failure. Hypertensive diencephalic syndrome is most often found in women with great emotional sensitivity. The blood pressure shows great fluctuations. The appearance, during any emotion, of a diffuse, blotchy red blush over the neck and upper thorax is the most characteristic feature. Other symptoms, among them tachycardia and an elevated metabolic rate, may lead to the incorrect diagnosis of thyrotoxicosis. The disease is prolonged and at 55 or 60 years of age, vascular disease may be minimal. Cerebral hemorrhage is the usual cause of death.

At about 50 years of age generalized arteriosclerosis with high blood pressure makes its appearance. With this group documentary evidence of the onset is especially important. Although often the blood pressure rise is primarily systolic, the pulse pressure is always great (usually in excess of 100). The aorta will show tortuosity, elongation and frequently calcification. The heart shadow may reveal evidence of left ventricular hypertrophy. The specific gravity of the urine is about 1.020; the urea clearance about 50 per cent of normal; and a trace of albuminuria is present. Any therapy which reduces cardiac output usually brings a good response. Death may occur between the ages of 65 and 90, from cerebral hemorrhage or coronary thrombosis. Of 600 hypertensive patients, 53.3 per cent had essential hypertension; 6.5 per cent had malignant hypertension; 7.8 per cent, diencephalic syndrome; and 30.5 per cent had hypertension secondary to arteriosclerosis. 8 references. 1 table.

#### 24. The Hemic and Lymphatic Systems

*See Contents for Related Articles*

#### 25. The Digestive System

*See Contents for Related Articles*

#### 26. The Endocrine System

Modern Endocrinology in Urologic Practice. *Arthur Grollman, Southwestern Medical College, Dallas, Tex.* J. Urol. 60:357-62, August 1948.

Despite the great interest in the pituitary gland and our present knowledge of its function in the organism, little of practical value to

the urologist has become available. One of the early signs of insufficiency of the anterior lobe of the pituitary gland, but not specific, is the failure of gonadal function. The pituitary-like urinary gonadotropin of pregnancy used in the treatment of cryptorchidism is derived from the chorionic tissue of the placenta and should not be confused with the pituitary hormone. It is only of value in about one-fourth of all cases of true cryptorchidism in which stimulation of the testes results in their descent into the scrotum. In cases of atrophy of the interstitial tissue, no response to chorionic gonadotropin occurs. Its use, therefore, is of aid in determining whether mechanical obstruction to descent of the testes is present, necessitating operation, or whether the testes will descend normally at puberty. In using chorionic gonadotropin, it is advisable to begin with small doses (200 international units) which are increased to 500 units if no untoward symptoms occur. The injections are given two or three times weekly for not over six weeks since excessive doses of the extract may lead to precocious puberty and to degenerative changes in the testes. Diabetes insipidus may be controlled adequately by replacement therapy with posterior pituitary extract. This may be administered by the insufflation of desiccated posterior pituitary powder or by the injection of aqueous extracts of posterior pituitary liquid or its tannate in oil. It should be emphasized, however, that polyuria and polydipsia are not infrequently seen as manifestations of psychogenic disorders. In such patients, obviously, treatment with posterior pituitary hormone is not indicated.

In urinary assays for gonadotropins, differentiation must be made between the follicle-stimulating hormone of the pituitary and the chorionic gonadotropin elaborated by certain tumors of the testis. Both give positive Friedman or Aschheim-Zondek tests. The follicle-stimulating hormone may appear following castration and its presence is no evidence of the existence of chorionic tissue. The pineal gland is of interest to the urologist only as a very rare cause of precocious puberty in the male. The urologist is rarely concerned with abnormalities in the thyroid gland. However, occasionally the earlier manifestation of thyroid insufficiency consists in a low-grade infection of the urinary tract with backache, which may bring the patient to the urologist's attention. This is another illustration of the occurrence of urinary tract infections in individuals whose resistance to infections is lowered and the urologist should be on the lookout for such systemic disorders as the cause of the urinary tract infection for which he is consulted. The parathyroids are of particular interest to the urologist since hyperparathyroidism, by inducing an abnormally high rate of excretion of calcium and phosphorus in the urine, may result in the deposition of calcium phosphate stones in the urinary tract. For this reason, every patient manifesting renal lithiasis should be investigated from the standpoint of the possibility of the existence of hyperparathyroidism, since only by removal of these glands will the condition be cured, whereas, if undetected, recurrent lithiasis will ultimately lead to irreparable kidney damage and death from renal insufficiency.

The diabetic comes to the attention of the urologist principally because of the complications of diabetes which are manifested in the genitourinary tract. Enuresis may be the first manifestation of diabetes in the child and should be considered when this is a symptom of complaint. The general tendency to infection in the diabetic often leads to infection of the genitourinary tract. When intercapillary glomerulosclerosis is prominent, one observes the clinical complex of hypertension, a nephrotic syndrome and diabetes designated as the Kimmelstiel-Wilson syndrome. It is marked by gross albuminuria, peripheral neuropathy suggestive of pseudotubes and retinopathy. Among the nervous complications of diabetes of interest to the urologist is atony of the bladder with residual urine secondary to neuropathy.

The adrenal glands, because of their anatomic proximity to the kidney and because of the influence of certain aberrations in function to these glands on the reproductive system, have been of particular interest to the urologist. The endocrinologist has elucidated the nature of many of the abnormalities of the reproductive tract which confront the urologist. The demonstration of the basically hermaphroditic nature of the individual and the role of the hormones in determining sex differentiation has clarified the development of congenital anomalies of the reproductive system. In no phase of urology has the contribution of endocrinology been so striking as in that of prostatic carcinoma. The idea that malignancy of this tissue might in some way be related to endocrine activity of the gonads has been long known. But this remained a conjecture until Huggin's demonstration of the effectiveness of castration in this disease. 9 references.—*Author's abstract.*

Gonadotrophic Hormone Therapy in Man Complicated by Antihormone Formation. *J. H. Leathem and A. E. Rakoff, Rutgers University, New Brunswick, N. J., and Jefferson Medical College and Hospital, Philadelphia, Pa.* Am. J. Obst. & Gynec. 56:521-26, September 1948.

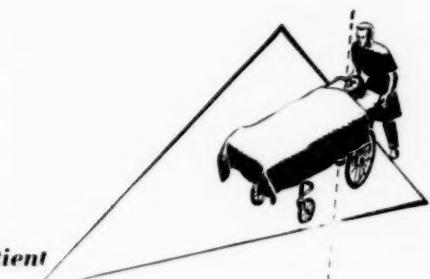
The hormone combination of sheep anterior pituitary extract plus human chorionic gonadotropin (Synapoidin) was used in the treatment of 34 carefully selected patients (4 men with hypogonadism; 30 women with complaints of amenorrhea, sterility and functional menstrual disorders). The laboratory findings on these patients suggested pituitary deficiency because of low urinary gonadotropins and low estrogen or 17-ketosteroid titers. The men received 15 rat units (1 cc.) by intramuscular injection two to three times per week during the first two weeks of each menstrual cycle. In 30 of the 34 cases antihormones failed to form. Careful testing of the serums ruled out individual differences and follow-up tests excluded the possibility of a latent period of antihormone formation. Thus antihormones will not form in three months, within the dosage range employed, and in 7 cases the duration of treatment was five to nine months. The largest total dosage used was 750 units, over a four month's period. The fact that antihormone formation interferes with the antici-

pated clinical response to the hormone was demonstrated in cases of menorrhagia. The condition was controlled by gonadotropic therapy for a time and the eventual failure of these patients to respond was correlated with the presence of antihormones. However, these inhibitors disappeared three months after the last injection. The sheep anterior pituitary extract may logically be assumed to be responsible for anti-hormone formation. At the present time total nitrogen as an index of hormone purification apparently should be limited to preparations of the same source in antihormone investigations. 12 references. 2 tables.

Creatine-Creatinine Metabolism in Adult and Juvenile Hyperpituitarism. I. Schrire, *British Postgraduate Medical School, London, England.* J. Endocrinol. 5:274-81, June 1948.

Two cases of acromegaly (a 42 year old woman and a 38 year old man) were reexamined after a period of eight years and the creatine-creatinine metabolism was studied. In both cases the creatinine excretion had dropped to normal levels and the steady and constant daily output contrasted sharply with the previous abnormal fluctuations. The creatine excretion was unchanged. The present daily output of creatinine in both cases was comparable to the quantities they excreted during periods of sex hormone injections. The results suggest that the acromegalic process is inactive in both patients. Increased creatinine excretion, creatinuria and a fluctuating output were used to assess the activity of the disease process. Of these three factors, only the creatinuria has remained unchanged. The gonadotropic principle may act directly on the creatine-creatinine processes, probably in the muscles. If the hyperactive anterior pituitary is inhibited, gonadotropic secretion is suppressed. The effect on creatinine excretion is direct and immediate, for the urinary output reverts to normal. The thyrotropic principle produces creatinuria by excessively stimulating the thyroid gland. Inhibition of this principle by sex hormones or operation does not necessarily effect the overactive thyroid which, upon hyperactivity, is independent of subsequent changes in the activity of the pituitary gland. A 5 year old boy who has grown rapidly was studied. The creatinine metabolism was comparable with that in acromegalic gigantism. The creatinine output was excessive and irregular and was reduced to normal levels by estrogen. There was no creatinuria before and after stilbestrol administration. During the administration there was a brisk creatinuria. It may be that all available creatine is being used for growth, with no surplus to excrete. By inhibiting the anterior pituitary with estrogen, there is suppression of growth and nonutilization of dietary creatine, producing creatinuria. Measurements showed that the gigantism was not eunuchoid but probably caused by an overactive anterior pituitary. 11 references. 4 figures.





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